PRELIMINARY ASSESSMENT
B & B WOODTREATING AND
PROCESSING INC. II
SAINT JUST INDUSTRIAL PARK
TRUJILLO ALTO, PUERTO RICO
PROGRAMO STORY

PUERTO RICO ENVIRONMENTAL QUALITY BOARD SUPERFUND PA/SI PROGRAM

**JUNE 3, 1992** 

**Prepared By** 

Jorge L Quiñones Pizarro

**Project Manager** 

Reviewed and Approved By

Johanna Padró Irizarry PA/SI Section Chief

388770

OMB Approval Number: 2050-0095 Approved for Use Through: 1/92

	_				T			
SEPA					Identification			
	Waste Site		/ ID		State: PR	CERCLIS N	umber:	
	Preliminary Asse	ssme	ent Fo	orm	CERCLIS D PRD	iscovery Date: 98737934	ı4	
1. General S	ite Information					ş.		
Name: B and B Wood	treating and Processing	Street Add		ad 848 evas W	km. 1.7	Saint J	ıst Inc	
Trujillo Alto	)	State:	Z Z	ip Code: 0976	County:	Co. Code;4	Cong.	
Latitude:	Longitude:	Approxim.	ate Area of S		Status of Site:			
18°22′ _4	12 N' 66° 00′ 09 W"	2.25	Acres Square	Ft	□ Active ἄ Inactive	☐ Not Specifie ☐ NA (GW pit	d ume, etc.)	
2. Owner/Op	erator Information							
Owner: B and B	Woodtreating and Proces	SSI Recray	<del>-</del> තිරිය (1	nactiv	ro.)			
Street Address: "Y	o St. Amelia Ind. Park	1	Address:	IIACLI	/e <i>)</i>			
City: Sabana	Ward	City:						
State:         Zip Code:           PR         00657	Telephone: (809) 782-9446	State:	Zip Code:	Telepi	none:			
Type of Ownership:  X Private  Federal Agency Name  State  Ingian	County  Municipal  Not Specified  Other	, =	itially Identifi Citizen Com PA Petition State/Local I RCRA/CER	piaint Program	<u>.</u>	Federal Progr incidental Not Specified Other		
3. Site Evaluator Information								
	Jorge L. Quiñones Pizarro PR Environmental Quality Board June 3, 1992					992		
	Street Address: PO Box 11488 City: San Juan State: PR							
Jame of EPA of State Agency Contact: Francisco Claudio Ríos			Street Address: PO Box 11488					
San Juan			PR	ੋਟਾਵਰnone (	(809) 764	-8824		
≟. Site Disposi	tion (for EPA use only)							
Emergency Response/Remo Assessment Recommendation  Ves  No Date:	· · · · · · · · · · · · · · · · · · ·	- 1	Signature: Name (typed)	):	ralley sis	<i>3</i> 0	- 11	

Potential Hazardous Waste Site Preliminary Assessment Form - Page 2 of 4			CERCLIS Number: PAD 987379344	
5. General Site Characteristi	ics			
Residential DOD	• • • •	Site Setting	g:  Urban Suburban Rural	Years of Operation: Beginning Year 1976  Ending Year 1989
Type of Site Operations (check all that apply):  Manufacturing (must check subcategory)  Lumber and Wood Products  Inorganic Chemicals  Plastic and/or Rubber Products	☐ Retail ☐ Recycling ☐ Junk/Salvag ☐ Municipal I	Landfill		Waste Generated:  Onsite Offsite Onsite and Offsite
☐ Paints, Varnishes ☐ Industrial Organic Chemicals ☐ Agricultural Chemicals ☐ (e.g., pesticides, fertilizers) ☐ Miscellaneous Chemical Products ☐ (e.g., adhesives, explosives, ink) ☐ Primary Metais ☐ Metai Coating, Plating, Engraving ☐ Metal Forging, Stamping ☐ Fabricated Structural Metal Products ☐ Electronic Equipment ☐ Other Manufacturing ☐ Mining	☐ Large ⊡ Small ⊡ Subut	ment, Storage, e Quantity Gen I Quantity Gen tle D Municipal Industrial	nerator	Waste Deposition Authorized By:  Present Owner  Former Owner  Present & Former Owner  Unauthorized  Unknown  Waste Accessible to the Public:  Yes  No
☐ Metais ☐ Coai ☐ Oil and Gas ☐ Non-metailic Minerais	☐ "Prote ☐ "Non- ☐ Not Specifie ☐ Other	ective Filer" - or Late Filer	, a	Distance to Nearest Dwelling, School, or Workplace; Feet
6. Waste Characteristics Info	ormation		!	
· ·	Waste Quantity: de units)	Tier*:	General Types of Wast	e (check all that apply)  Pesticides/Herbicides
Landfill Surface impoundment Drums Tanks and Non-Drum Containers Chemical Waste Pile Scrap Metal or Junk Pile Tailings Pile Trash Pile Topen dump) Land Treatment Contaminated Ground Water Plume unidentified source: Contaminated Surface Water/Sediment 'unidentified source) Contaminated Source Contaminated Source Other Machine W	1.50 Acres		Organics Inorganics Solvents Paints/Pigments Laboratory/Hospital Radioactive Waste Construction/Demot	Acids/Bases  Oily Waste  Municipal Waste  Mining Waste  Explosives  Other  as Deposited (eneck all that
* C = Constituent, W = Wastestream.	V = Volume, A = A:	rca		

 EP	Ά
0	

Potential Hazardous Waste Site

CERCLIS Number:

Preliminary Assessment Form - Page 3 of 4  PBD 987379 344				
7. Ground Water Pathway				
Is Ground Water Used for Drinking Water Within 4 Miles:  Yes No Yes No No  Type of Drinking Water Wells Within 4 Miles (check all that apply):  Municipal Private None No  Is There a Suspected Release to Ground Water:  Water:  Yes No No If Yes, Enter Primary Target Drinking Water Wells Been Identified: Yes No If Yes, Enter Primary Target Popular		Withdrawn From:  0 - ¼ Mile  > ¼ - ½ Mile  > ½ - 1 Mile  > 1 - 2 Miles		
Depth to Shallowest Aquifer:  (0-15 Feet  Karst Terrain/Aquifer Present:  Yes No	Nearest Designated Wellhead Protect Area:  Underlies Site  > 0 - 4 Miles None Within 4 Miles			
8. Surface Water Pa	thway			
Type of Surface Water Draining Site and 15 Miles Downstream (check all that apply):  Stream River Pond Lake Bay Ocean Other Creek  Is There a Suspected Release to Surface Water:		Shortest Overland Distance From Any Source to Surface Water:    15		
□ No	<u>.</u>	> 100 yr - 500 yr Floodplain   > 500 yr Floodplain		
Drinking Water Intakes Located Along the Surface Water Migration Path:  Yes No Have Primary Target Drinking Water Intakes Been Identified: Yes No If Yes, Enter Population Served by Primary Target Intakes: People		List All Secondary Target Drinking Water Intakes:  Name Water Body Flow (cfs) Population Served    N / A		
Fisheries Located Along the Surface Water Migration Path:  Yes  No  Have Primary Target Fisheries Been Identified:  Yes  No		List All Secondary Target Fisheries:  Water Body/Fishery Name Flow (cfs)  Jorre Cilla lagoon Complex N/A		

\$	<b>EPA</b>
----	------------

Potential Hazardous Waste Site Preliminary Assessment Form - Page 4 of 4

CERCLIS Number:

Preliminary Assessment Form - Page 4 of 4 PRD 987379 344				
8. Surface Water Pathway (contin				
Wetlands Located Along the Surface Water Migration Path:  ■ Yes □ No	Other Sensitive Environments Located Along the Surface Water Migration Path:  Yes  No			
Have Primary Target Wetlands Been Identified:   Yes No	Have Primary Target Sensitive Environments Been Identified:  Yes No			
List Secondary Target Wetlands:  Water Body Flow (cfs) Frontage Miles  Torrella lagoon UA 2.62	List Secondary Target Sensitive Environments:  Water Body Flow (cfs) Sensitive Environment Type  Pitiones State forest NA			
9. Soil Exposure Pathway	,			
Attending School or Daycare on or Within 200 Feet of Areas of Known or Suspected Contamination:	Workers Onsite:  None  1 - 100  101 - 1,000  > > 1,000  If Yes, List Each Terrestrial Sensitive Environment:  None  Have Terrestrial Sensitive Environments Been Identified on or Within 200 Feet of Areas of Known or Suspected Contamination:  Yes  No			
□ Yes ■ No	Wetlands Located Within 4 Miles of the Site:  ■ Yes □ No			
Enter Total Population on or Within:  Onsite				
U - % MILE	Other Sensitive Environments Located Within 4 Miles of the Site:			
> ¼ - ½ Mile	■ No			
>1 - 2 Miles I	List All Sensitive Environments Within 1/2 Mile of the Site:  Distance Sensitive Environment Type/Wetlands Area (acres)			
>2 - 3 Miles >3 - 4 Miles	Onsite NA			
Total Within 4 Miles	0 - 14 Mile <u>N/A</u>			
	> 16 - 1/2 Mile			

# PRELIMINARY ASSESSMENT NARRATIVE REPORT

Date

June 3, 1992

Prepared by

Jorge L. Quiñones Pizarro

PR Environmental Quality Board

Region II, Hato Rey, Puerto Rico

Site

B and B Woodtreating and Processing, Inc. II

Saint Just Industrial Park, Cuevas Ward

Trujillo Alto, Puerto Rico

EPA ID No.

PRD 987379344

\* \* \*

#### 1. INTRODUCTION

Under authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendment and Reauthorization Act of 1986 (SARA), the PR Environmental Quality Board conducted a Preliminary Assessment (PA) at the B and B Woodtreating and Processing, Inc. II site in Saint Just Industrial Park, Cuevas Ward, Trujillo Alto, Puerto Rico. The purpose of this investigation was to collect information concerning conditions at the site to assess the threat posed to human health and environment and to determine the need for CERCLA/SARA or other appropriate action. The scope of the investigation included review of available file information, a Comprehensive Target Survey and an Off-Site Reconnaissance (May 11, 1992).

# 2. SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

#### 2.1 Location

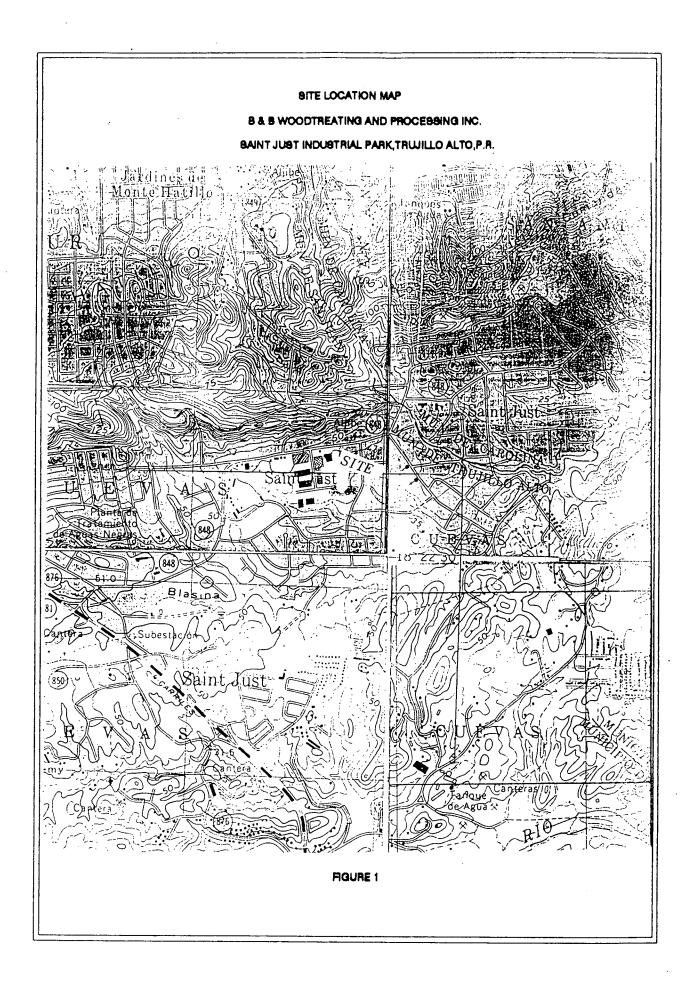
B and B Woodtreating and Processing Inc. II was located in the Saint Just Industrial Park in Trujillo Alto, Puerto Rico (Figure 1, 2). The geographic coordinates are 18° 22' 42" N latitude; 66° 00' 09" W longitude (Ref. 1). To reach the site travel south from San Juan on Muñoz Rivera Avenue until reach State Road #3 (Regimiento 65 de Infantería), then travel east until the intersection with State Road #181 and turn to the right. Travel south on Road #181 until the intersection of State Road #848. Turn to the left and travel up to km. 1.8 where the entrance to the Saint Just Industrial Park is located. Turn to the right, at the end of the street turn to the left. The abandoned building to the right is where the site is located (Ref. 28). The climate in San Juan is tropical marine. A temperature at National Weather Service Station, in Old San Juan ranges from an average of 27.2°C, in August to 23.9°C in January.

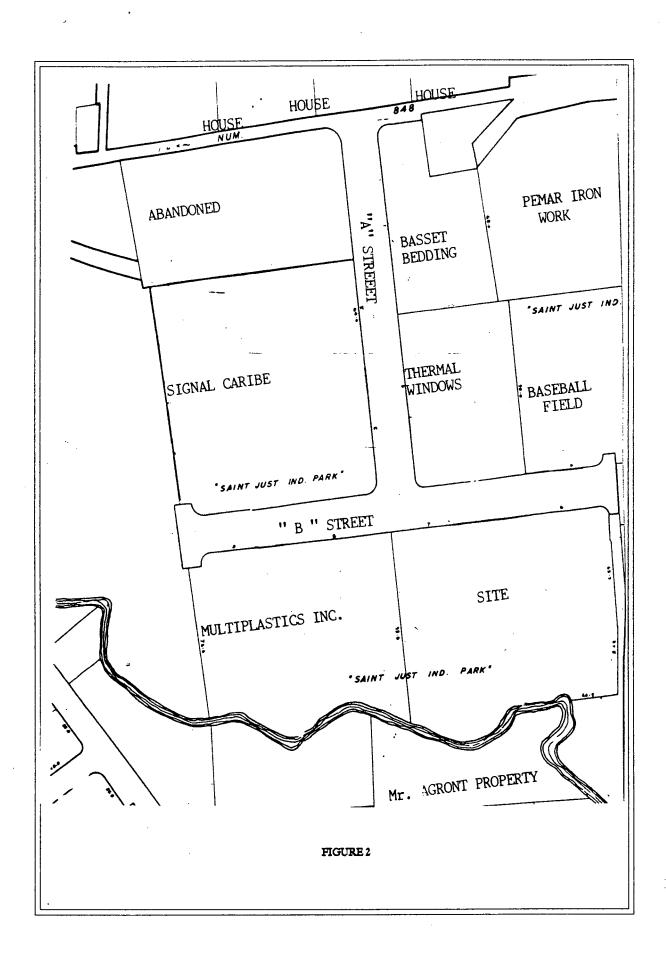
Throughout Puerto Rico rainfall increases inland toward the mountains. In the San Juan Metropolitan Area, the average annual rainfall ranges from 60 inches on the coast to 80 inches, 5 miles in land. Rainfall is seasonal with a rainy period from July through October (the hurricane season) and a secondary wet period in May.

In Puerto Rico the prevailing trade wind is from the east or the north-northeast; however, from September to November there is an alternating of wind currents from the south and the southeast (Ref. 2).

#### 2.2 Site Description

The site is located in Saint Just Industrial Park, Cuevas Ward, in Trujillo Alto and is surrounded by other industries. North of the site is located a baseball field and Thermal Windows Industries, to the south a private property owned by Mr. Harry Agront and the





Blasina Creek. To the west Multiplastics Industries, and to the east Equipos de Borinquen Inc. (Fig. 2).

The site is located on a relatively flat terrain that drains toward the Blasina Creek. The total area of the site is approximately 2.25 acres. The area is fenced at the sides and the front. The front fence has two gates, one of them is always open. The back portion of the site lacks an access control device. The site at present is inactive and abandoned. All the structures were destroyed by hurricane Hugo, trespassers and vandals. The area is also covered with debris and solid wastes that people dump there. During the site reconnaissance a man (scavenger) was observed inside the property. A pit where the treating machinery and pumps were located was observed filled with green colored water. Also the walls near the area were green colored.

Mr. Ernesto Guisasola said that the site once consisted of four (4) structures: one for wooden doors manufacturing and raw material storage area; a second one for maintenance area and a treated wood dehumidifier, the third one was the offices, machinery, treating cylinders and tanks were located, and the last one was used as a wood storage area. The open lot in front of the buildings was used to stored the treated wood.

The site soil was covered with gravel. There is a storm water sewer that runs from north to south under the eastern part of the site, and drains toward the Blasina creek (Ref. 3). There are approximately 30 houses near the site (about 120 persons) all part of Cuevas Ward (Saint Just).

# 2.3 Operational History and Waste Characteristics

The company was established in 1976 in Saint Just Industrial Park, Trujillo Alto, Puerto Rico. It was engaged in the treatment and preservation of wood. Also for a while they manufactured wooden doors and windows. On 1989 they moved to the Amelia Industrial Park, to a property owned by PRIDCO. They moved mainly as consequence of Hurricane Hugo that destroyed the old site structures. According with Mr. Ernesto Guisasola, acting

supervisor of the woodtreating area, at their facilities in Saint Just they used the same processes that they actually used in their Guaynabo Site. Currently, the industry use a mixture of chromate copper arsenate (CCA-70%) and water (Ref. 32). They mix approximately 10 gallons of water for every pound of CCA, that yields a concentration of 0.23-0.26 of CCA in the wood. The company receives 47,000 pounds of CCA concentrate in containers every 3 month, and mix it with water and use an average of 2,600 gallons of solution daily. All the wastewaters and solutions are recycled and store in tanks.

In addition, Mr. Guisasola said that when the wood have completed the treating process it was removed from the treating cylinder and let it dry on the cement floor of a wood storage area with roof. Then the treated wood was placed in a "dehumidifier" oven to eliminate excess of water and then stored in an area that is front of the site and that was covered with gravel.

He also mentioned, that there were two tanks, one of 10,000 gallons, used to store the CCA-water mixture the other a 6,000 gallons tank used to store water. The treating cylinders were located in a pit as well as the pumps used in the treating process. Both pits were interconnected to prevent that in the event of a spill it would reached the environment. The pit measure 10" x 15" and about 2 to 3 feet in depth (Ref. 3).

On 1990, Mr. Genaro Torres, Chief of Environmental Emergency Response Office, performed an inspection to the facility due to a complaint of dead fishes in the creek. In this occasion, he found a dike and a septic tank filled with a green colored water. Also in the Blasina Creek, adjacent to the site he found many solid wastes coming from the site including empty CCA concentrate containers. Also Mr. Torres was told that in one occasion two childrens were swimming in the dike waters (Ref. 4).

During May 16-21, 1990, a private septic tank cleaning company transported 80,000 gallons of waters containing chemicals from a tank in the Saint Just site to another tank located at the new site in Guaynabo (Ref. 5, 6).

On June 22, 1990, Mr. Luis Morales, PR Environmental Quality Board Complaint Division Director, send a letter to Mrs. Milagros Cruz from B & B Woodtreating. In this letter he certified that during an inspection performed on June 1990, they observed that former deficiencies related to the disposal of solid wastes were corrected (Ref. 7).

Quantum Laboratories Inc., an analytical services company submitted on July 11, 1990, an analysis report to B & B from samples taken in the site. The samples were analyzed for arsenic, chromium, copper and pH (Ref. 8).

On a memorandum dated on July 23, 1990, from Milagros Santos, Chief of the PR Environmental Quality Board Laboratory, to Genaro Torres Chief of Emergency Response Office, states that the results of the samples collected on the site on May 24, 1990, yields high levels of chromium, cooper and arsenate. The samples were green-gray colored and turbed (Ref. 9).

On May 11, 1992, Superfund PA/SI Personnel performed an onsite/offsite reconnaissance. On this occasion Mr. Harry Agront and Mrs. Ana E. Huertas, owners of a private property, south to the site, said that in the creek they found many empty drums (apparently CCA concentrate drums), trucks tires, and three vans. The vans once belong to an Ice Cream, Co. that was located where Multiplastics is today. Mr. Agront said that the owner of B & B site promise to clean the creek before they leave, but they never did. He also mentioned that in one occasion various local residents trespassed the site property and found several dead pigeons inside the old treating cylinder pit. The creek was inhabit by turtles, shrimps and crabs, but they alleged that the contaminants discharged by the company killed them (Ref. 3).

#### 3. GROUND WATER PATHWAY

#### 3.1 Hydrogeologic Setting

Groundwater once supplied much of the water requirements of the San Juan Area (which includes the northern portion of Trujillo Alto), however with the completion of Lago Loíza reservoir in 1953, surface water gradually replaced ground water as the source of supply.

A variety of alluvial, terrace, blanket sand, beach and dune deposits ranging in age from miocene to holocene mantles the bedrock over much of the area. Terrace and blanket sand deposits are sometimes referred as old alluvium and form a veneer of red to white silty clay, sand and clay, and sand over the older formations. The surficial deposits are not an important source of water in the San Juan area, though they do serve as a conduit for recharge to underlying aquifer.

The sand and limestone aquifers of the coastal plains are the principal water-bearing formations. Recharge to these formations is principally on their outcrops by rainfall and infiltration of streamflow; discharge is principally into swamps and lagoons along the coastline (Ref. 2).

The average annual rainfall is 75" near the coast on the north shore, annual average precipitation is 60". About 55 percent of the average annual rainfall is lost due to evapotranspiration. Depending on local geology and physiography, recharge to aquifers ranges from as much as 20" the northcoast limestone belt to 5" or less in the aluminum-filled areas of the south coast (Ref. 10).

According with the USGS Water Resources Investigations 41-75, examination of more than 100 drillers logs from wells in the San Juan Area show the alluvial deposits to be highly clayey and relatively unfavorable for the development of wells, except possibly in some stream valleys (Ref. 2). In terms of specific local conditions the site is located over

holocene aluminum deposits, which consists of sand, clay and sandy clay. Beneath is the Guaracanal formation (Paleocene) which consists of coarse purplish or reddish-gray basaltic flow breccia, generally weathered to clayey sand containing abundant grains of horblende. It is poorly stratified tuffaceous wacke and pebble to cobble conglomerate. Have a maximum exposed thickness of 170 meters (Ref. 11). At the site the groundwater is approximately 10-15 feet deep and runs in southeast direction towards the Blasina creek.

#### 3.2 Ground Water Targets

The population within a 4 miles radius relies on a municipal surface water supply. There are many municipal wells within 4 miles from the site but most of them are abandoned, in bad operating conditions and/or lack pumps. Others are used only during emergency situations or to inject chlorine to the drinking water system. There is no evidence of private wells within 4 miles from the site (Ref. 12-17).

#### 3.3 Ground Water Conclusions

The San Juan Metropolitan area do not depend on groundwater as a drinking water source. A release of contaminants to groundwater is suspected because the site top soil is covered with gravel. Beneath this, alluvium deposits are present which are highly permeable. In addition, the ground water is near the ground surface. However this situation represent no threat to human health since the are no drinking water wells within 4 miles from the site.

#### 4. SURFACE WATER PATHWAY

### 4.1 Hydrologic Setting

There are no drinking water intakes located within 15 downstream miles of the site. All residents in the area are served by PR Aqueduct and Sewer Authority Water Supply

System. There is a surface water intake at the Carraízo Dam at approximately 3.50 miles upstream from the site (Ref. 18-20).

There are two surface water bodies near the site. The first, San Antón creek at approximately 0.70 miles in a north direction from the site; but not within the surface drainage pathway. This creek eventually flow into the San José Lagoon. The other is Blasinna creek which is adjacent to the site and runs in north direction into La Torrecilla Lagoon at 6.2 ft<sup>3</sup>/S (Ref. 21). Both of them have been classified by the Puerto Rico's Water Quality Standards regulations as SD, which means surface waters intended for use as a raw water source for public water supply and propagation and preservation of desirable species. These waters cannot be safely used for primary and secondary contact recreation. These water bodies received urban runoff and land disposal wastewaters (Ref. 22-23).

## 4.2 Surface Water Targets

The Blasina creek, runs from south to north into Torrecilla lagoon complex. The Torrecilla and Piñones lagoons are primary wildlife areas. These lagoons are located east of the metropolitan area of San Juan, with more than 10,000 acres in area, its vegetation is dominated by mangrove forests but other plant communities occur, such as literal woodland, freshwater swamp and marshes, and coconut plantations. The Piñones State Forest portion of this large and complex area was designated a Natural Reserve in 1979.

The forest supports a diverse fauna including birds, reptiles, fish, and crabs, among others. Four species of fiddlers crabs have been identified in the area. The area is popular among fishermen, which harvest a number of species both for commerce and sport. In addition the area is used for recreational swimming. At least 89 bird species have been recorded from the area. It supports a large number of herons and egrets, a considerable population of the Brown Pelican, terns and gulls. The Great Egret was observed nesting at Carmelita Island. Also was observed one individual of the yellow-shouldered blackbird foraging along with a number of Greater Antillean Grackles and Shiny Cowbirds. The west Indian whistling duck and masked duck have been reported from the area by hunters.

A variety of migratory birds such as water thrushes, king fishers, ospreys, and a variety of warblers are abundant during the winter months. As many as 300 birds have been observed landing at night. With the ongoing accelerated degradation of the Constitution Bridge mudflats, the role of the Torrecilla-Piñones complex for migrant and resident wading and shorebirds is magnified. It is a primary wildlife area (Ref. 24-25).

There is a shorefishing area that spans from Río Grande de Loíza in Loíza Aldea to Condado Bridge in San Juan. Topography is predominantly level along the rude coastal area. Two of the major estuarine and lagoonal systems of the Island are located between these paints; the Río Grande de Loíza and the Torrecillas and Piñones Lagoons. From Loíza to Boca de Cangrejos there are many miles of sandy beaches. Although most of the shoreline is accessible through route 187 which runs along residual sand dunes, shorefishing is very much restricted by the heavy wave action occurring most of the time. The most popular fishing spots along this area are the mouth of the Río Grande de Loíza, the Boca de Cangrejos and Condado's Bridge. According with the Federal Emergency Management Agent (FEMA) maps the site is located on a minimal flooding area (Ref. 27).

#### 4.3 Surface Water Conclusions

There is the possibility that contaminants have reached surface water because the Blasina creek is adjacent to the site. In addition, raw material cans were dumped directly into the creek. There is no drinking water intakes within 15 downstream miles from the site. The only surface water intake near to the site is located at Carraízo dam at approximately 3.50 miles upstream.

The Blasina creek runs from south to north into the Torrecilla and Piñones Lagoons which are primary wildlife areas. The Piñones State Forest portion was designated as a Natural Reserve in 1979. There is a shorefishing area that spans from Río Grande to Condado Bridge in San Juan. If a spill in the site occurred, the Blasina creek was directly affected; so a direct impact on the Torrecilla/Piñones lagoons complex and the shorefishing areas is probable.

#### 5. SOIL EXPOSURE AND AIR PATHWAYS

#### 5.1 Physical Conditions

The industry top soil is covered with gravel, debris and also heavy vegetation in the southern part. As a consequence of Hurricane Hugo there are many destroyed structures. The site has been closed since 1989 and is partially fenced. The back portion of the site lack fence. Also there is a gate in the front, however it is always open. Vandals and trespassers enter the site freely to deposit all kinds of solid wastes and/or stole property from the site. The site has a moderate slope that drains toward the Blasina creek. No odors were detected during a site reconnaissance performed on May 11, 1992.

#### 5.2 Soil and Air Targets

The site is located in Saint Just Industrial Park surrounded by other industries and residences. Near the site are approximately 30 houses (about 120 persons) part of Cuevas Ward, Saint Just. West to the site is Multiplastics, Inc. which have 70 employees and to the northwest is Signal Caribe with about 240 employees (Ref. 29, 30). The total population within 4 miles radius of the site is 147,279, determined using the 1980 Census of Population and Housing (Ref. 31). There are no workers onsite.

At approximately 2.5-3 downstream miles, north east is located the Torrecilla and Piñones lagoons which are primary wildlife areas (Ref. 24, 25).

# 5.3 Soil Exposure and Air Pathway Conclusions

A release of contaminants to the air is not suspected because the site is inactive. Also, during the site reconnaissance no odors were detected. The soil is suspected to be contaminated because the treated wood was storaged over the ground in many areas within the site, most of them areas covered only with gravel.

#### 6. SUMMARY AND CONCLUSIONS

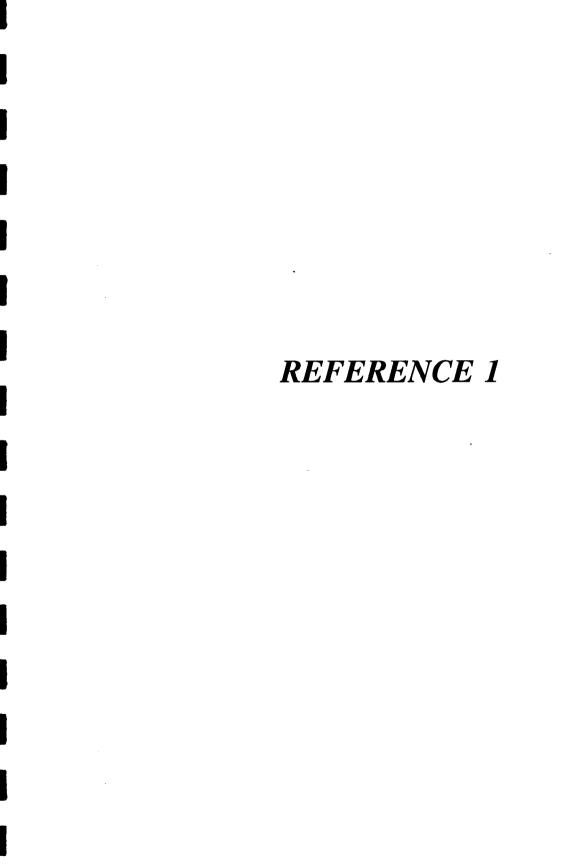
B & B Woodtreating and Processing Inc. began operations back on 1976, in Saint Just Industrial Park Trujillo Alto. Since then, its has been engaged in the wood treating and preserving process. Also for a while they manufacture doors and windows. On 1989, as a consequence of Hurricane Hugo they moved to the Amelia Industrial Park in Guaynabo, to a property owned by PRIDCO. For the wood treating process the company used a mixture of chromium cooper arsenate (CCA) and water as preservative.

The site area is fenced at the sides and the front. The front fence has two gates one of them is always open. The back portion of the site lacks an access control device. There is a pit filled with green-colored waters. Also, the walls near the pit areas are green-colored. A release of contaminants to groundwater and surface water is suspected but pose a minimal effect on human health because there are no drinking water wells or surface water intakes within 4 downstream miles from the site. The air pathway appears to pose a minimal threat because the site is inactive and heavily vegetated. No odors were detected during a site reconnaissance performed on May 11, 1992. Based on all the above and the PRE-Score results, this site is recommended for a low priority site inspection.

#### REFERENCES

- 1. Latitude and Longitude Calculation Worksheet when using the Coordinate Grid Cell.
- 2. Groundwater in the San Juan Metropolitan Area. Puerto Rico US Geological Survey Water Resources Investigations 41-75
- 3. Onsite/Offsite Reconnaissance Study Plan and Reporting Form Photo Log
- 4. Personal Interview Note
- 5. Material Safety Data Sheet, Metro Pozos Invoices
- 6. Telecon Note
- 7. Letter from Mr. Luis Morales (EQB) to Mrs. Milagros Cruz (B & B)
- 8. Analysis Report from Quantum Laboratories
- 9. Memorandum to Genaro Torres (EQB) from Ms. Milagros Santos (EQB Lab.) reporting the analytical sampling results.
- 10. PR Groundwater resources, National Water Summary
- 11. Department of the Interior U.S.G.S. Geologic Map of the San Juan, Carolina, Gurabo, and Aguas Buenas Quadrangles, PR
- 12. Telecon Note
- 13. Telecon Note
- 14. Telecon Note
- 15. Telecon Note
- 16. US Department of the Interior, Geological Survey Water Resources Division Groundwater Site Schedule
- 17. PRASA Water Resources Division, Wells Inventory
- 18. PRASA Filter Plants and Intakes in Puerto Rico
- 19. Puerto Rico Aqueduct and Sewer Authority Water Supply Systems Map, San Juan Aguas Buenas, Carolina, Gurabo (January, 1983)
- 20. PRASA Public Water Supplies in Puerto Rico 1983
- USGS Water Data Report PR-90-1; Water Resources Data; Puerto Rico and the US
   Virgin Islands Water Year 1990
- 22. PR Environmental Quality Board; Surface Waters Use Inventory
- 23. PR Environmental Quality Board Goals and Progress of Statewide Water Quality

- Management Planning PR 1988-1989
- Department of Natural Resources Critical Wildlife Areas of Puerto Rico, PR Coastal Zone
   Management Program, September, 1988
- 25. Department of Natural Resources Critical Wildlife Areas of Puerto Rico, Resources Planning Area, San Juan, PR 1988
- 26. Department of Natural Resources, Marine Sport Fisheries Creel Survey Scientific Research Area, April, 1989
- 27. Federal Emergency Management Agency, Flood Insurance Rate Map, Commonwealth of PR, Community-Panell Number 720000-054C Revised December 15, 1990
- Topographic Map, Aguas Buenas, Carolina, Gurabo and San Juan Quadrangles, Puerto Rico, minute series 1969, Photorevised 1982
- 29. Telecon Note
- 30. Telecon Note
- 31. US Department of Commerce Bureau of the Census, 1980 Census of Population and Housing
- 32. Material Safety Data Sheet (CCA)



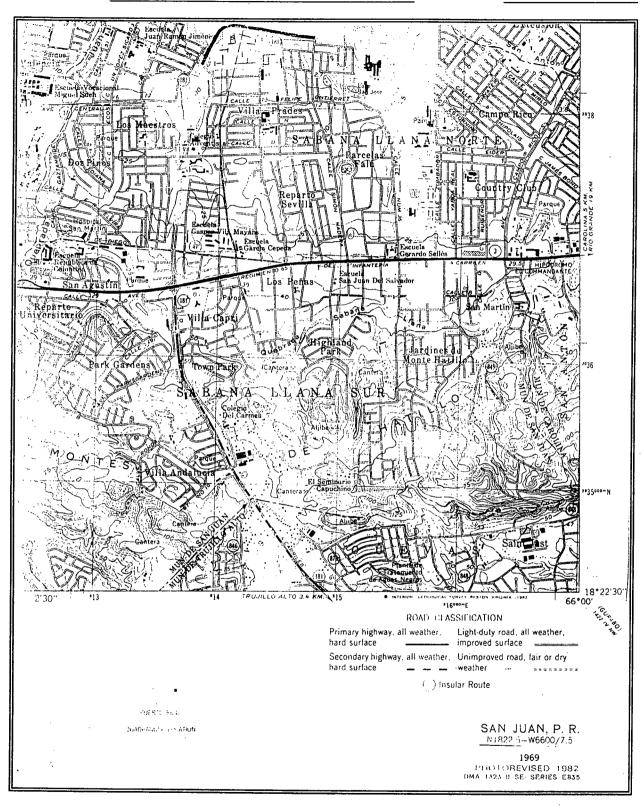
REF:	1

DATE: May 11, 1992

# LATITUDE AND LONGITUDE CALCULATION WORKSHEET WHEN USING THE COORDINATE GRID CELL

SITE	NAME: B and B Woodtreating and Processing, Inc. II CERCLIS #:
AKA:	B and B Woodtreating SSID:
	ESS: Road 848 km. 1.7 Saint Just Industrial Park, Cuevas Ward
	Trujillo Alto STATE: PR ZIP CODE: 00976
	REFERENCE POINT:
USGS	QUAD MAP NAME: San Juan TOWNSHIP: N/A N/S RANGE: N/A E/W
SCAL	E: 1:20,000 MAP DATE: 1969 SECTION: N/A 1/4 1/4 1/4
	DATUM: 1940 PHOTOREVISED: 1982 MERIDIAN: N/A
COOR	DINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (ATTACE
РНОТ	OCOPY):
LONG	ITUDE: <u>66° 0' 0" W</u> LATITUDE: <u>18° 22' 42</u> " N
COOR	DINATED FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:
LONG	ITUDE: <u>66° 0' 0" W</u> LATITUDE: <u>18° 22' 42"</u> N
CALC	ULATIONS: LATITUDE (7.5' QUADRANGLE MAP)
A)	ALIGN THE GRID CELL (7.5' WIDE X 2.5' HIGH) WITH THE NEAREST LATITUDE REFERENCE POINT TO THE SITE.
<b>B</b> )	ADD TO THE REFERENCE LATITUDE POINT THE CORRESPONDING INCREMENTS OF 1 SECONI
	UNTIL THE SITE LOCATION.
C)	WRITE DOWN THE CORRESPONDING LATITUDE COORDINATE OF THE SITE IN DEGREES
	MINUTES AND SECONDS.
	SITE LATITUDE: <u>18°22'42</u> " N
CALC	ULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)
A)	WITHOUT DISPLACING THE GRID CELL, LOOK FOR THE LONGITUDE THAT APPEARS ON THE NORTH-EAST CORNER OF THE QUADRANGLE.
B)	ADD TO THIS LONGITUDE THE CORRESPONDING INCREMENTS OF ONE SECOND UNTIL THE SITE
	LOCATION
C)	WRITE DOWN THE CORRESPONDING LONGITUDE COORDINATE OF THE SITE IN DEGREES MINUTES AND SECONDS.
	SITE LONGITUDE: 66°00'09" W

PREQB INVESTIGATOR: Jorge L. Quiñones



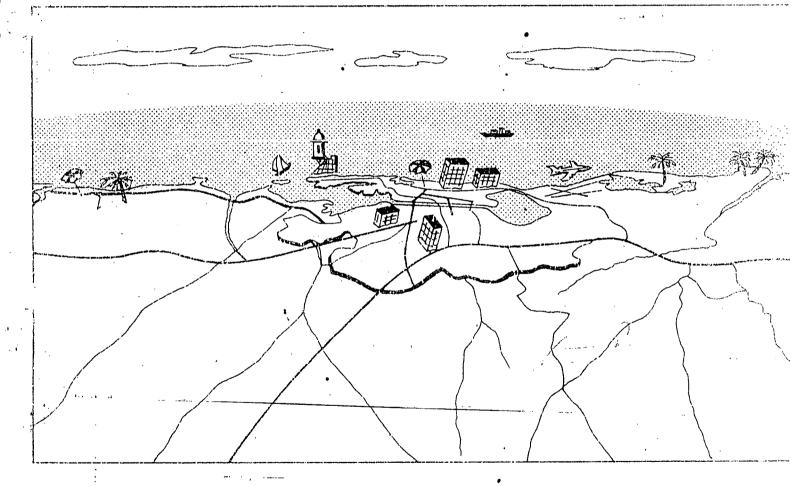
TOPOGRAPHIC MAP QUADRANGLE NAME: San Juan SCALE: 1:20,000 COORDINATES OF LOWER RIGHT-HAND CORNER OF 2.5-MINUTE GRID: LATITUDE: 18° 22' 42" N LONGITUDE: 66° 00' 09" W

REFERENCE 2

# GROUND WATER IN THE SAN JUAN METROPOLITAN AREA, PUERTO RICO

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 41-75



Prepared in cooperation with Commonwealth of Puerto Rico



fastest economic growth rates in the world in the past 25 years.—The Commonwealth has grown at a rate comparable to Israel and Japan and about twice that of the continental United States—more than 10 percent per annum.

The population of the San Juan metropolitan area has grown 26 percent from 1950 to 1960 to 647,979 inhabitants; and 31 percent from 1960 to 1970 to 851,247 inhabitants. Almost one third of all the inhabitants on the island live in the San Juan metropolitan area. The trend in population is outward to the suburban areas as transportation, housing, and living standards improve, and as the urban center becomes more commercialized.

The industries in and around San Juan are similar to those of other large cities. The leading types of commercial establishments are food products, tobaccos, textiles and clothing, furniture and wood products, printing, chemicals, cement, metal fabrication, machinery and electrical equipment, glass, petroleum refineries, rum distilleries and breweries. Although the island's rate of unemployment is high, more than 12-percent (1970), the rate in San Juan is comparable to the continental United States average of 6 percent.

#### Climate

The climate in San Juan is tropical marine. Air temperature at the National Weather Service station, in Old San Juan, ranges from an average of  $27.2^{\circ}$ C in August to  $23.9^{\circ}$ C in January.

Throughout Puerto Rico rainfall increases inland toward the mountains. In the San Juan metropolitan area, the average annual rainfall ranges from 60 in (1,520 mm) on the coast to 80 in (2,030 mm) 5 mi (8 km) inland. Rainfall is seasonal with a rainy period from July through October (the hurricane season) and a secondary wet period in May. The dry season occurs between January and April. In an average year, there are 209 days of measurable precipitation in Old San Juan.

Figure 2 shows the long-term annual rainfall at Río Piedras and Old San Juan. Wet and dry periods are evident from the 5-year moving average. Of particular prominence are the severe droughts of the 1920's, 1930's and 1960's.

Pan evaporation measured at the Old San Juan weather station exceeds rainfall by about 20 in (508 mm) a year. The average annual evaporation measured over 4 decades is 82 in (2,080 mm) with an average monthly high of 8.04 in (204 mm) in March and a low of 4.48 in (114 mm) in December. A short distance inland at Rio Piedras, however, the rainfall, 74.2 in (1,880 mm), exceeds the pan evaporation, 72.4 in (1,840 mm).

In Puerto Rico the prevailing trade wind is from the east or the north-northeast; however, from September to November there is an alternating of wind currents from the south and the southeast. In addition, there are breezes caused by the differential heating of the land and the sea--during the day the breeze is from the sea to land, but at night it is reversed.

Caño Martín Peña and the Laguna San José (fig. 3). Elsewhere it lies beneath a mantle of alluvium and other surficial deposits. The following description of the formation is given by Zapp, Bergquist, and Thomas (1948), "It consists almost entirely of very dense conchoidally fracturing limestone of white, light gray, buff and rose colors; unit is quite uniform over its entire outcrop and throughout its entire thickness." The map by Monroe and Pease (1962) of the Bayamon quadrangle shows the limestone outcrops, both of the Aguada and Aymamon to be quite extensive, forming the tops of many of the haystack hills. In the Bayamon area the Aymamon is either pink or white, well indurated, usually dense limestone, 215 ft (65 m) thick were exposed. Kaye (1959) estimates the thickness of the Aymamon to be as much as 2,000 ft (600 m) at the coastline. Geophysical studies at Palo Seco indicate an aggregate thickness of middle Tertiary limestones (Aguada and Aymamon) to be about 3,000 ft (900 m).

#### Surficial Deposits

A variety of alluvial, terrace, blanket sand, beach, and dune deposits ranging in age from Miocene to Holocene mantles the bedrock over much of the study area. Terrace and blanket sand deposits are sometimes referred to as old alluvium, and form a veneer of red to white silty clay, sand and clay, and sand over the older formations. 'The thickness of these deposits may be more than 100 ft (30 m) in San Juan (fig. 6).

A blanket of loosely cemented dune sand of Pleistocene age overlie the Santurce and Old San Juan areas. The dune sand is composed of quartz and calcite grains, cemented in a calcite matrix. The Holocene deposits include beach sand, swamp and lagoon mud, and recent alluvium or flood-plain deposits of the existing river systems.

#### HYDROLOGY

Rainfall on the inland mountain slopes drains into four main catch sent areas—Río Grande de Loíza, Río Piedras, Río de Bayamón, and Río de la Plata (fig. 1). For the most part, these basins lie on relatively impervious volcanic rock; runoff is rapid, commonly resulting in flash flooding in the lower urbanized reaches of the streams.

Water infiltrating the volcanic rock flows largely through the weathered zone and then into stream valleys. Some ground-water flow through the volcanic rock may ultimately recharge the Tertiary sand and limestone aquifers.

The sand and limestone aquifers of the coastal plain are the principal water-bearing formations in the San Juan area. Recharge to these formations is principally on their outcrops by rainfall and infiltration of streamflow, and discharge is principally into swamps and lagoons along the coastline. Discharge from the confined zones of these aquifers probably is by vertical leakage to the overlying formations.

A possible secondary source of recharge to the aquifer in urbanized areas is leaky water and sewer lines.

In the following section of the report, the terms specific capacity, transmissivity, and hydraulic conductivity will be used in reference to the hydraulic properties of the aquifers. Specific capacity, expressed in gallons per minute per foot of drawdown or cubic metres per second per metre of drawdown is, as the units indicate, the yield of a well divided by the difference between the nonpumping and pumping water level (drawdown) in a well for a time period. The duration of discharge in this report is for a period of 8 hours. Hydraulic conductivity (formerly referred to as coefficient of permeability) is the volume of water that will pass through 1 ft<sup>2</sup> (1 m<sup>2</sup>) of an aquifer in 1 day; whereas, transmissivity is the volume of water that will pass through a 1-ft (1-m) wide vertical section, the full thickness of an aquifer in 1 day. Hydraulic conductivity is expressed in (ft<sup>3</sup>/day)/ft<sup>2</sup> [cubic feet per day per square foot] or ft/day [feet per day]. Transmissivity is expressed as (ft<sup>3</sup>/day)/ft [cubic feet per day per foot] or ft<sup>2</sup>/day [feet squared per day]. In metric terms, hydraulic conductivity is expressed as (m<sup>3</sup>/day)/m<sup>2</sup> [cubic metres per day per square metre] or m/day [metres per day], and transmissivity is (m<sup>3</sup>/day)/m [cubic metres per day per metre] or metre] or metre] or metres per day [square metres per day].

Wells in the metropolitan area are often perforated the entire length of their casings. Consequently, wells starting in the unconfined aquifers may be completed in the confined aquifers and tap both zones. Composite yields and water levels commonly result. Often the yield of a well is controlled to a large degree by the most permeable aquifer tapped, and the water level in a well may be higher or lower than that in the unconfined aquifer owing to the head effects of the lower confined aquifer. Consequently, direct use of well data to describe well performance and aquifer characteristics can be misleading. Variations in transmissivity of the coastal aquifers shown in figure 3 are primarily a composite of the transmissivity of the various water-bearing units.

#### Ground-Water Levels

Altitudes of the water surface in the volcanic and sedimentary rock unconfined aquifers and of the potentiometric surface of the confined zones of the sedimentary rock aquifers are shown in figure 7. The water surface in the volcanic rocks reflects the control exerted by surface drainage features with ground-water discharge being primarily to streams. But it also shows that in interbasin areas there is some ground-water discharge from the volcanic rocks directly to the sedimentary rocks as indicated in the Montes de Hatillo area, south of Hato Rey. Ground-water levels in the unconfined aquifers of the sedimentary rock also show control exerted by surface-drainage features along the major rivers. The potentiometric surface of the confined zones of the aquifer, in contrast, reflects the head created by the ground-water levels in the recharge area and friction losses in the aquifer.

Observations of the ground-water levels (fig. 8) show that recharge generally occurs during the rainy season from August through November, with a secondary recharge period in April or May. Recharge, however, can occur at any time of the year as the result of major rainstorms.

Water-level fluctuations reflect the hydraulic characteristics of the aquifers. The Candelaria well 64 (fig. 8) is situated on the high plateau west of Bayamón, the recharge area for Tertiary formations in the Bayamón area. The wide fluctuation of the water levels in the well indicates the generally low permeability and porosity of the Cibao Formation. A water-level high of 58 ft (18 m) below land surface was reached in late 1966, following several successive wet years. The low water level of record was 99 ft (30 m) below land surface in mid-1964, in response to the dry years of 1963-64. Ordinarily there is about a 10-ft (3-m) variation between the high-water levels in the rainy season and the low levels in the dry season in this well.

The Truman well 142 (fig. 8), along with a number of other Puerto Rico Aqueduct and Sewer Authority wells in San Juan, is used to supplement municipal supply during dry periods when surface-water storage is low. Measurements were taken in the Truman well, both under nonpumping and pumping conditions. The well shows only very modest changes in water level from a high of 13 ft (4.0 m) to a low of 24 ft (7.3 m) below land surface. The low level was primarily a reaction to the drought of 1963-64, when the well was being pumped continuously. Because of the high permeability and storage of the limestone, a more constant water level is sustained during adverse conditions than in the less permeable Cibao and San Sebastian Formations.

#### Recharge

The average annual recharge to an aquifer or aquifer system determines the long-term yield that can be obtained without depletion or other damage to the aquifer. Recharge usually occurs on the outcrop surface of the aquifer either from the infiltration of rainfall or from surface water from streams that flow across the outcrop. Occasionally recharge will be from underlying or overlying water-bearing formations.

Rainfall is usually the principal source of recharge. Even then a combination of certain conditions must occur before recharge will result. Rainfall must be sufficient to overcome soil moisture demands and yet be of low intensity for maximum infiltration to occur. As these conditions are usually reached only during the rainy season, recharge is cyclic.

The condition of the outcrop area that receives recharge is also critical—the surface must be permeable. Throughout metropolitan San Juan, the recharge areas of the aquifers are being urbanized. High-density housing, streets, and other impervious surfaces are or will greatly impair the receptivity of the recharge areas of the aquifers.

The principal recharge areas in the Bayamon area are the high plateau or ridge of Aguada and Aymamon Limestones lying on top of the Cibao Formation and the outcrop area of the Cibao and San Sebastian Formations to the south (figs. 3, 4, and 5). Important to the recharge on the plateau and the area to the south are the large areas of blanket sand forming an absorbent surface through which rainfall can percolate to the underlying limestone and sandstone. Water infiltrating the ridge flows either northward through the Aguada Limestone or downward through the Cibao Formation and south to the San Sebastian Formation (see fig. 3, section A-A').

In the San Juan-Carolina area, recharge to the San Sebastian Formation is derived from rainfall on the outcrop area, in places mantled by alluvium, from flow losses from the Río Piedras in the intake area, and from underflow through the weathered zone in the volcanic rocks of Montes de Hatillo. Recharge to the Cibao Formation, to the Aguada Limestone, and to Aymamon Limestone is primarily from rainfall on the outcrop area of the Cibao, by percolation through the alluvium mantling these formations, and to a lesser extent through isolated limestone mogotes.

- Within the Carolina area, a mogote ridge, Cerro San José (fig. 3, section D-D') is a source of recharge to the limestone and possibly to the underlying sand aquifer of the Cibao Formation. The water-table map (fig. 7) indicates a low swell in this area that may indicate the contribution of local recharge.

Recharge to the aquifers of the metropolitan area is undoubtedly being reduced by extensive urbanization of the intake areas. It is possible that much of the natural recharge that has been lost because of roads, housing, and other impervious structures is being made up by leakage from water and sewage mains. The  $28 \times 10^6$  gal/day (1.2 m³/s) unaccounted loss from the metropolitan distribution system lends credence to this possibility.

#### <u>Volcanic</u> Rocks

The bedrock aquifer consists of consolidated rocks principally of marine volcanic origin. These include siltstone, tuff, breccia, andesite, and limestone of Cretaceous and early Tertiary age. Usually these rocks are fine grained and tightly compacted and do not yield water freely to wells. Water that is available flows through cracks, fractures, and bedding planes in the weathered zone of the bedrock. In general, the water-bearing zone is a surficial mantle as much as 300 ft (90 m) thick.

Wells producing from the bedrock aquifer are chiefly in the eastern half of the metropolitan area tapping Tertiary-Cretaceous siltstone underlying the Montes de Hatillo and the Carolina area. The average yield of 25 wells is 52 gal/min (3.3 l/s) with a maximum yield of 300 gal/min (19 l/s). Specific capacities of wells averaged 1.4 (gal/min)/ft [2.9 (l/s)/m] of drawdown. No wells are known to tap the Cretaceous limestone in the Carolina area; however, modest yields possibly could be derived from this formation if metamorphism has not destroyed the original porosity or if secondary solution openings have developed.

# Sedimentary Rocks and Surficial Deposits

The Tertiary sedimentary rocks comprise the principal aquifers of the coastal lowlands. Water-bearing units in these rocks range in composition from sand and gravel to nearly pure limestone.

Quaternary sediments predominately of alluvial origin, mantle the Tertiary rocks throughout much of the area. Clay and silt are the principal constituents of these deposits in the coastal areas, but inland in association with the mogotes of Tertiary rocks are high-level

computed above. At the present time, about  $10 \times 10^6$  gal/day  $(0.44 \text{ m}^3/\text{s})$  is pumped by wells from the aquifer, mainly in Campanilla and Sabana Seca. The current artificial draft on the aquifer is roughly half the estimated recharge rate.

In the San Juan-Carolina area, fresh water in the unconfined aquifer is found only in the upper part of the Cibao Formation and the Aguada Limestone. Well yields of more than 2,000 gal/min (130 l/s) can be obtained from the fresh-water part of the aquifer in the San Juan area; although, the yields usually are restricted to less than 200 gal/min (13 l/s) depending upon the proximity of the salt-water front. Data are too few to give a valid evaluation of the unconfined aquifer in the Carolina area. Akers (written commun., 1965) reported a well yielding 2,500 gal/min (158 l/s) of marginal-quality water (350 mg/l chloride) in the limestone, east of the Río Grande de Loíza.

Estimates of transmissivity and ground-water gradients in San Juan indicate that seaward ground-water discharge through the aquifer is on the order of 1 ( $10^6$  gal/day)/linear mi [27 (1/s)/linear km], approximately, along the fresh-water contact. The apparent recharge area for the unconfined aquifer, however, does not appear to be extensive enough to supply the required volume of water. Recharge to the unconfined aquifer could be augmented by lateral flow from the unconfined part of the San Sebastian Formation and lower part of the Cibao Formation and leaky water or sewer mains.

The Aymamón Limestone is part of the unconfined aquifer and in the San Juan-Carolina area it contains mostly salt water. Wells tapping the Aymamón near the sea yield as much as 2,000 gal/min (I30 l/s) of salty water.

#### Surficial Deposits

The surficial deposits are not an important source of water in the San Juan area, though they do serve as a conduit for recharge to underlying aquifers. The Pleistocene eclianite deposits along the coast yield water high in chloride concentration, mainly to shallow wells. Locally, in Carolina, a few wells tap abundant supplies from Holocene alluvial deposits. Sources of fresh water, formerly described as recent alluvial deposits, are often sand and gravel deposits of the San Sebastián Formation. Examination of more than 100 driller's logs from wells in the San Juan area show the alluvial deposits to be highly clayey and relatively unfavorable for the development of wells; except possibly in some stream valleys.

Yields from several industrial wells tapping the alluvium of the Río Grande de Loíza on the eastern edge of the study area are as much as 700 gal/min (44 1/s), but they are not typical of well yields from the alluvium in the metropolitan area. Records available for 17 wells in surficial deposits show a median yield of 60 gal/min (3.8 1/s).

# Surface Water-Ground Water Relationship, Río de Bayamón Basin

The base flow of streams is ground-water discharge from the adjacent aquifers. Base

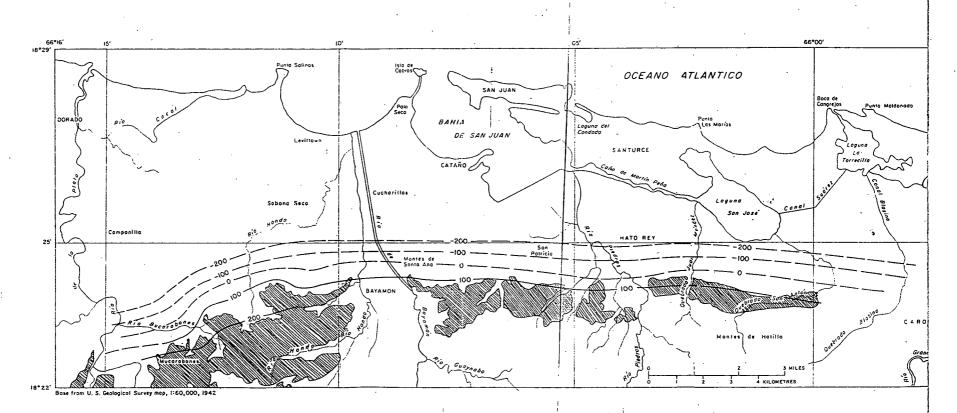


FIGURE 4-- OUTCROP AREAS AND ALTITUDE OF THE TOP OF THE SAN SEBASTIAN FORMATION.

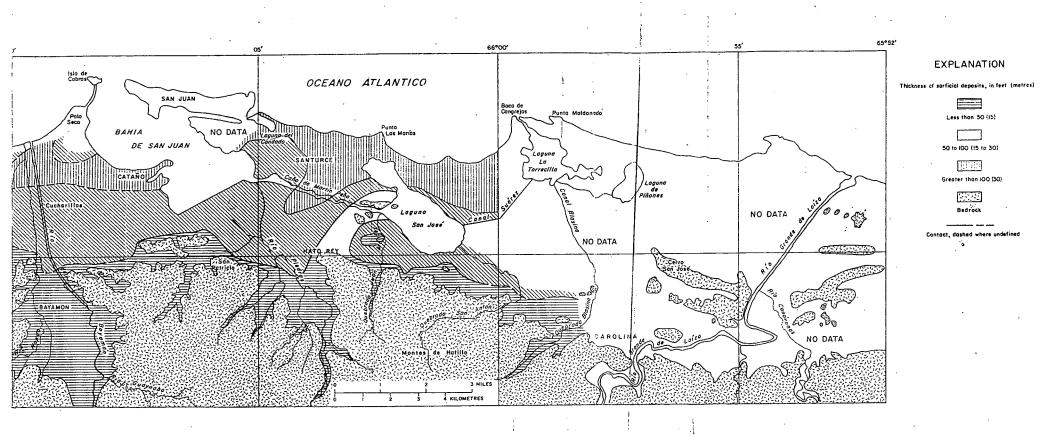


FIGURE 6-- THICKNESS OF SURFICIAL DEPOSITS IN THE SAN JUAN AREA.

REFERENCE 3

## ONSITE/OFFSITE RECONNAISSANCE STUDY PLAN

Site Name: B and B Woodtealing and Proceeding TE CERCLIS #: DAN 4873/4349
Site Address: Board 848 Km 1.7 Smint Just Industrial Park
Cuevas ward, Srigillo alto Puesto Béco
Coordinates: 18° 22' 42" N 66° 00' 09" W
For the B+B Woodtuating and Processing I
site, one or both of the following, will be performed on <u>May 11,1992</u> ,
by Joseph Vinano Pipano:
Off-Site Reconnaissance
On-Site Reconnaissance

#### A. Off-Site Reconnaissance

During the off-site reconnaissance, the EQB's Superfund PA/SI personnel will perform a perimeter survey of the site of concern, in order to verify previous information, or collect new data. Most observations will be obtained through a windshield survey or walking around the out-site area but without trespassing private property. Permission from legal owners will be obtained previous to any site entry. All the information gathered during the reconnaissance will be recorded on the field notebook.

The specific tasks scheduled for this reconnaissance are as follow:

## Field Observations

Items	Data to be evaluated	Data to be obtained	N/A (Data already available)
Site Access			
Site Address		✓ ·	
Nearest Residence			
Nearest School/Day Care Center			
Location of Wells			
Location of Surface Water Bodies		<b>/</b>	
Potential Overland Flow Pattern			
Land Uses			
Evidence of Hazardous Waste Migration			°
Urban Development			
Estimate Local Population			
Sensitive Environments			
Others:			
	•		

#### Field Documentation

Location Sketches	Municipal Authorities
Photographs	Public Water Authorities
Interviews	Soil Survey Office
Local Residents	Health Department
School Authorities	Local Workers

#### B. On-Site Reconnaissance

During the Onsite Reconnaissance, the EQB's Superfund PA/SI personnel will conduct a site entry which will include activities such as interviews with the site operators and workers, as well as a file search and survey of all main areas and sources within. Site access will be arranged previous to each site entry. Each and

every on-site related activity will be conducted based on the previously approved Generic Health and Safety Plan.

Photographic evidence will be collected during the reconnaissance and recorded in a photo log. In addition to the photo log, all site sketches and observations will be registered on the field logbook.

#### Field observations/documentation

	Site history		
	Number of workers		
	Environmental Permits		
Ū∕	Previous spills/releases		
	Manufacturing processes	_	
	Raw materials typequantitycontainment	<b>1</b>	Sources type location dimensions
Image: Control of the	Waste types		
	Disposal methods		
<b>4</b>	Migration pathways		
	Others:		

#### C. Equipment

	Field Logbook	Q	Safety Glasses
	Topographic Map		Tyvek
	Public Water System Maps		Helmet
Ø	Geologic Map		Safety Shoes
	35mm Camera & accessories		Ear Protectors
	Instamatic Camera & accessories		Gloves
	Compass		HNu
	Binoculars		OVA
7	Range Finder		Radiation Meter
			pH Paper
	0' -150'		Others:

# OFF SITE/ON SITE RECONNAISSANCE INFORMATION REPORTING FORM

Date:

May 11, 1992

Site Name:

B & B Woodtreating and Processing Inc. II

**Site Address:** 

Road 848 km. 1.7 Saint Just Industrial Park

Cuevas Ward, Trujillo Alto, Puerto Rico 00976

**EQB Personnel:** 

Name

Discipline

Johanna Padró

Geologist

Bernice Pérez

Agronomist

Jorge L. Quiñones

**Biologist** 

Weather Conditions (clear, cloudy, rain, snow, etc.):

Cloudy with occasional showers.

Estimated wind direction and wind speed:

Northeast to south direction.

**Estimated temperature:** 

89°C

Signature:

Jorge L. Quiñones Pizarro

**Date:** May 11, 1992

# B & B WOOD TREATING AND PROCESSING INC. II SAINT JUST INDUSTRIAL PARK, TRUJILLO ALTO,P.R. BASEBALL FIELD 11 10 1 В S 2 I N В Α S Ţ THERMAL WINDOWS 6 R E E T 5 C R E E K 7. PIT 8. CONTROL PANEL 9. WOOD STORAGE AREA 10. STORM SEWER 11. RAW MATERIAL STORAGE AREA 12. UNKNOWN ORIGIN TANK 1. WOODEN DOOR MANUFACTURING AREA 2. MANTAINANCE & DRYING AREA 3. TANKS AREA 4. WOOD TREATING CILINDERS AREA 5. TREATING CILINDERS PIT 6. OFFICE AREA

# OFF SITE/ON SITE RECONNAISSANCE INFORMATION REPORTING FORM

Date:

May 11, 1992

Site Name:

B & B Woodtreating and Processing Inc. II

\* \* \*

0930 - Superfund PA/SI personnel arrived to the Saint Just Industrial Park in Trujillo Alto to visually inspect the areas surrounding the site in order to collect data. The site is located in Saint Just Industrial Park in Trujillo Alto and surrounded by other industries and many houses part of Cuevas ward. North to the site is located a baseball field, and Thermal Windows Industry; to the east, Equipo de Borinquen, Inc., and a private property; to the south, adjacent to the site is the Blasina creek and many private properties; to the west is Multiplastics Inc.

There are approximately 100 houses near the site (about 400 persons) all part of Cuevas ward. The site is fenced in the front and the sides with cyclonefence. The back portion of the site lack a fence. The front fence has two gates one of them is always open and allows foreign persons to get inside the property. The site soil is covered with gravel. There are four (4) abandoned structures in the site. The area is covered with debris, solid wastes and few empty drums.

At 0932 - Superfund personnel arrived to B and B Woodtresting and Processing Inc. II, to perform a site inspection. Since 1976, the company was engaged in the wood treating process. Two years ago, they moved to the Amelia (waterfront) Industrial Park, Guaynabo. The total area of the site is 2.25 acres. The lands where the site is located are owned by B and B Woodtreating and Processing.

0935 - Mr. Ernesto Guisasola, Supervisor of the Woodtreating Area, in the Cataño plant and his son meet with Superfund PA/SI personnel.

0939 - Mr. Guisasola took us to see the different areas of the facility. He explains what was located in each structure. On the first building to the east was located the wooden doors manufacturing area. This used to be a material storage area where the glue was stored. Next to this building, was another structure where the maintenance area and a treated wood dryer (dehumidifier) were located. The dehumidifier was a kind of oven used to dry the treated wood.

To the center of the site is another structure. In the inside, the offices, pumps, and treating machinery were located. Outside were the treating cylinders and two vertical tanks. One of them of 10,000 gal used to store the CCA mixture and the other a 6,000 gal tank used to store water. The two (2) treating cylinders were inside a pit also the machinery and pumps. The walls where the pit and tanks were located are green colored. The pit located inside the structure is filled with rain waters, also stained with a green color. According to Mr. Guisasola, the outside pit was covered in order to avoid accidents.

To the west there was another structure used as a wood storage area. In this area the wood was stored before it was treated. Part of the floor area was green colored. After the treatment was completed, the wood was placed once again in this structure and then moved to the dehumidifier (dryer). Finally, the wood was stack at the front of the facility. At this area we observed a big steel tank within the backside bushes. Mr. Guisasola couldn't tell us how it get there, he also said that the nearby creek was once inhabit by crabs, turtles and shrimp. These species were formerly caught by workers from his company.

1130 - A storm water sewer that drains toward the creek and runs under the eastern part of the site was observed.

1135 - Leave the site.

1137 - Mr. Guisasola guide the Superfund Personnel to the surrounding areas and to a property adjacent to the site.

1145 - Visit to a private property to the south, adjacent to the site, in order to observed the

backside of the site and the creek. The property belongs to Mr. Harry Agront and Mrs. Ana E. Huertas. Mr. Agront took Superfund Personnel through this property and show us the creek. He said that in the creek he found many empty drums, truck tires, and three old vans. The vans once belongs to an Ice Cream co. that was located where Multiplastics is located today. He said that the owner of the B and B site promise to clean it before he leave, but he never did. He said that in one occasion, many pigeons were found dead in the B and B's old treating pit. He alleged that the creek was inhabit by turtles, shrimps and crabs, but the contaminants discharged into it killed them. He also showed us that the slope that drains towards the creek is covered with many pieces of treated wood now covered with vegetation.

# OFF SITE/ON SITE RECONNAISSANCE INFORMATION REPORTING FORM

Date:

May 11, 1992

**Site Name:** 

B & B Woodtreating and Processing Inc. II

Camera:

Canon T-50 35mm

Film:

Kodak Gold GA 135-12 - 12 exp.

**Photographer:** 

Johanna Padró

#### PHOTO LOG

ROLL/PHOTO NUMBER	TIME	DESCRIPTION
1-1	1135	Fence and front of the site
1-4	1142	Open gate at the front of the site, and an abandoned structure of the site.
1-5	1145	Another view of the site from east to west; abandoned structures and debris can be observed.
2-1	0942	Debris, empty drums, and the abandoned wooden doors manufacturing area. A trespasser (with the bicycle) can be observed inside the site.
2-2	0945	Empty drums, debris abandoned structure where the wooden doors manufacturing area was located.
2-4	0949	Abandoned structure where the maintenance and

			dehumidifier/dryer area was located.
	2-6	0955	Abandoned structures where the pumps, instruments,
			control panel and office were located can observed
			green colored walls and the pit filled with "rain
			waters", also green colored.
	2-8	1005	Waste pile (solid wastes and soil) and the office-
			machinery abandoned structures part of them
			covered with vegetation.
	2-9	1010	Vegetation, an UST tank of "unknown" origin
	2-11	1130	Storm water's sewer that runs from north to south,
			under the eastern part of the site and drains toward
٠			the Blasina creek.
,	2-12	1150	Blasina creek on Mr. Agront property, adjacent to
			the site.
	2-13	1152	Blasina creek from Mr. Agront property
	3-1	1147	Vans deposited over the Blasina creek, in Mr.
			Agront property.
	3-3	1152	Blasina creek at Mr. Agront property. In this area
			it drains a storm sewer.
	3-6	1200	Storm water sewer, an old CCA concentrate drum,
			and the creek. Black colored stains can be observed
			in the soils around the water.

.



РНОТО 1



PHOTO 2



РНОТО 3



РНОТО 4



РНОТО 5



РНОТО 6



РНОТО 7



РНОТО 8



РНОТО 9



**PHOTO 10** 



**РНОТО** 11



**PHOTO 12** 



**РНОТО 13** 



**PHOTO 14** 



**РНОТО 15** 

## POZOS SEPTICOS



SERVICIO Y MANTENIMIENTO DE PLOMERIA Ave. Campo Rico GP 11 - Urb. Country Club, Río Piedras, P. R. 00924 P.O. Box 4909 Carolina, P.R. 00628

Tels. Country Club: 750-1000 762-4142	Tel. Bayamón: 787-3147	Tels, Río Piedras:	769-5467 768-2833
SU RECIBO RE PAGO  CLIENTE: S & S U U	DO REATMENTS	y 18,	<u> </u>
DIRECCION ZWE WAY	RESIDENCE INSTITUTE	<del></del>	
DESCR	IPCION	GALONES	costo
POZO (ACA)O 1) E	- An WILE		
(TRANSFAR)	8 000 Bar S		
PLANTA DE TRATAMIENT	ro		
CISTERNA:	<u> </u>		
CISTERNA:		oten)	
OTROS:	ne for		
	<u> </u>		
Condiciones de pago: DE		TOTAL 🔷	
	s leer y examinar el contenido de		

NOTA: No firme sin antes leer y examinar el contenido de este documento. Su firma al final indica que Usted esto conforme con la labor realizada, la cual debera pagar en efectivo y en el acto al terminar el trabajo. De hacer pago con cheque Usted se compromete a no impedir el pago del mismo. Si lo hiciese o si dicho cheque resultase sin fondos Usted pagara los daños mas gastos, costos y honorarios de abogados en caso de reclamacion judicial o extrajudicial.

Acepto Conforme:

Servicio Sanitario Publico — A toda la Isla , Limpiamos Plantas de Tratamientos Trampas de Grasa — Cisternas y Otros



SERVICIO Y MANTENIMIENTO DE PLOMERIA Ave. Campo Rico GP 11 - Urb. Country Club, Río Piedras, P. R. 00924 P.O. Box 4909 Carolina, P.R. 00628

Tels. Country Club: 750-1000 762-4142	Tel. Bayamon: 787-3147	Tels. Río Piedras:	769-5467 768-2833
SU RECIBO DE PAGO  CLIENTE DA DU  DIRECCION ULL ENU	ood Maton arcalero ten	Ay 21,	19 <u>90</u>
AFSC	RIPGION A		1
POZO / AP / (I/A)	de torque 1	GALONES	costo
( )	ac sargue /	<i>/</i>	<del>  </del>
(nonver)	8.000 Lak	<del>/                                     </del>	<del> </del>
PLANTA DE TRATAMIEN	TO:	<u> </u>	<del>                                     </del>
	- $A$		
CISTERNA:	-/-/-//	Ai	
	1 / 00/60	Harrie	
OTROS :	- July-	2	<del>/</del>
Condiciones de pago: DE	CONTADO	TOTAL •	
NOTA: No firme sin ante al final indica que Usted e efectivo y en el acto al ter mete a no impedir el pago	s leer y examinar el contenido de sto conforme con la labor realiza minar el trabajo. De hacer pago e del mismo. Si lo hiciese o si dich s gastos, costos y honorarios de s	e este documento. Su da, la cual debera pa con cheque Usted se o o cheque resultase si	gar en compro-
•	Acepto Conforme:		
Servicio Sanitario	Publico – A toda la isla, Limpiar	nos Plantas de Tratar	mientos

Trampas de Grasa — Cisternas y Otros

NU

4277

## POZOS SEPTICOS



SERVICIO Y MANTENIMIENTO DE PLOMERIA

Ave. Campo Rico GP 11 - Urb. Country Club, Río Piedras, P. R. 00924

P.O. Box 4909 Carolina, P.R. 00628

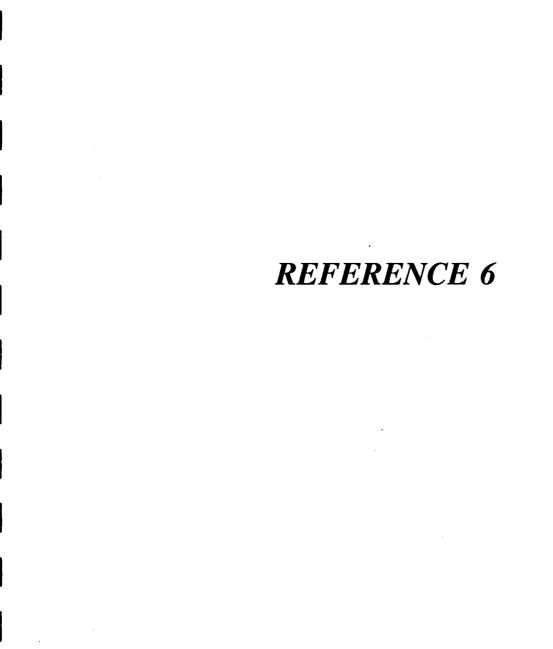
Tels. Country Club: 750-1000 762-4142	Tel Bayamon 787-3147	/ Tels. Río Piedras:	769-5467 768-2833
SU RECIBO OF PAGO  CLIENTE DE LOS	ned Treats	Yay 21,	19 <u>90</u>
DIRECCION KILL COUL	Karcassero Jan	ra, Catori	<u>N</u>
) (DES	CRIPCION (	GALONES	COSTO
POZO//// ALA PLANTA DE TRATAMIE	De Konque,	6	
TEANTA DE TRATAMIE	•		
CISTERNA: OTROS:	Jps M	Two way	
Condiciones de pago:	DE CONTADO	TOTAL	
condiciones de pago.	DE CONTADO	TOTAL 💠	1

NOTA: No firme sin antes leer y examinar el contenido de este documento. Su firma al final indica que Usted esto conforme con la labor realizada, la cual debera pagar en efectivo y en el acto al terminar el trabajo. De hacer pago con cheque Usted se compromete a no impedir el pago del mismo. Si lo hiciese o si dicho cheque resultase sin fondos Usted pagara los daños mas gastos, costos y honorarios de abogados en caso de reclamación judicial o extrajudicial.

Acepto Conforme:	
------------------	--

Servicio Sanitario Publico — A toda la isla, Limpiamos Plantas de Tratamientos Trampas de Grasa — Cisternas y Otros Modelo Núm. 55 9 marzo 1984 Regl. Cont. Mun. (Sec. 14)

		ESTADO LIBRE	ASOCIADO DE PUER	TO RICO		
ESTA PATENT	E	Municipio de	TRUJILLO ALTO	0	No	240398
— NO ES — TRANSFERIBLE	E	. T.F.	MUM			90
	PA	CENTE	MUNI	CIPAL	NUM •	IERO DE PATENTE
Expedida A:	SAIN	IT JUST MILLW				
66-041-2906		1AM	NUFACTURA PUEF	RTAS Y MARCO	S Im	porte Pagado 612.21
Número de	Cuenta		Clase de Nego	cio	Φ	012.21
Calle	SAINT JUST y Número		cimientos Situac		Calle y Número	
Calle KM. 1.0	y Número		cimientos Situac		Calle y Número	
KM. 1.0 TRUJILLO ALTO Calle	y Número		cimientos Situac			
KM. 1.0 TRUJILLO ALTO Calle	y Número y Número				Calle y Número	, 19_86



#### PR ENVIRONMENTAL QUALITY BOARD Ref. 6 SUPERFUND PA/SI PROGRAM PERSONAL INTERVIEW NOTE DATE: CONTROL NO: TIME: PRD 987379344 May 21, 1992 0800 **DISTRIBUTION:** B and B Woodtreating and Processing II BETWEEN: OF: PHONE: (809)Cathy Perez (Secretary) Metro Pozos Inc. 762-12230 AND: Jorge L. Quiñones Pizarro **DISCUSSION:** Waters Transport She has the knowledge that one employee transported waste waters from a tank in the facilities of B and B Woodtreating in Saint Just to a tank in the new facilities in Amelia Industrial Park, Guaynabo, When she went check the employee showed her where he delivered and disposed the waters. She describe it as a "underground cement tank and that part of it is above the ground".

REFERENCE 7

Junta de Calidad Ambiental

22 de junio de 1990

Sra. Milagros Cruz B & B Woodtreating P.O. Box 3849 Hato Rey, Puerto Rico 0919

QDS 83-0079

Certifico que en inspección realizada durante el mes de junio? de 1990 se corroboro que se habían corregido las deficiencias senaladas anteriormente, relacionadas con la disposición de los desperdicios sólidos.

Esperando esta carta cumpla con sus propósitos. 🗟

Cordialmente,

Team of the city of the all a carry Luis R. Morales Ramos

Director

Oficina de Querellas de la lablada an la Quebruda Disalla of all and the modern taken about the last to the course of There do les the many thing (uses por sus states en ingles).

to the energy of melography and the hander 2 to

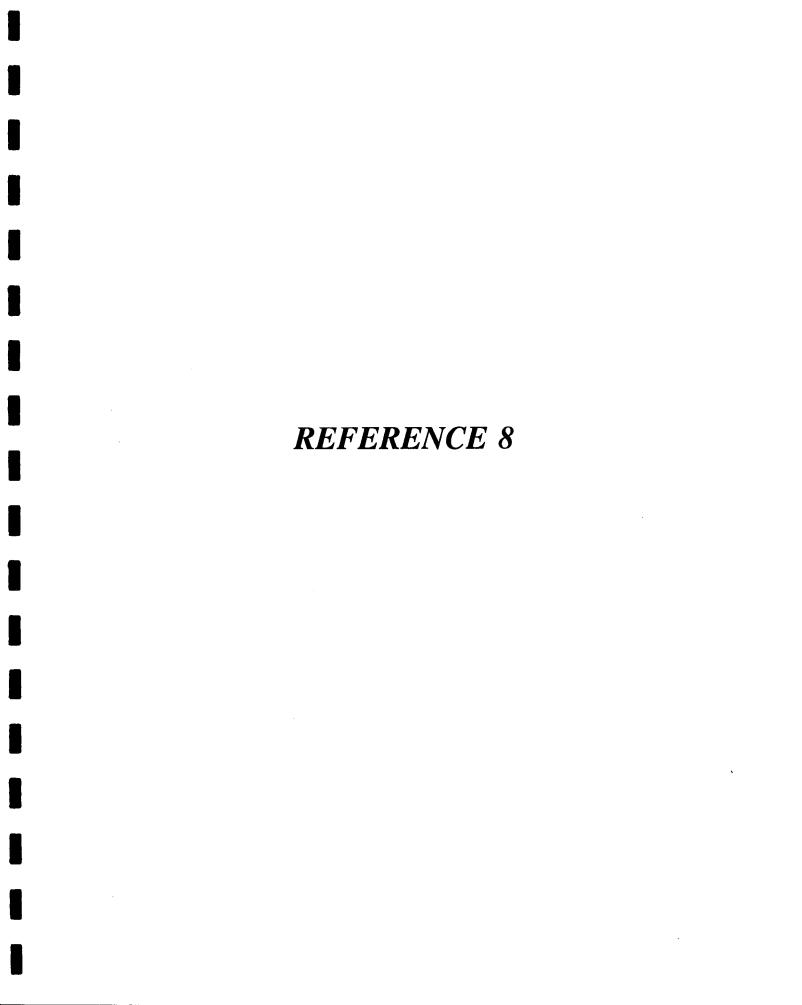
a control or serve les Allegosprocurescos. the some as the light on detector our concentrations do resource of the job federes, theological deportures you

dun ten estandores cordinaciones para eguas presentados sos

List the control of the son aquelles reques superfictable to the second of the second

so a some on lipsus a tody tipo do negarização

Vulando por la pureza que usted desea, en el ambiente que lo rodea. OFICINA DE LA JUNTA: EDIFICIO BANÇO HACIONAL PLAZA / AVE. PONCE DE LEON 431 / HATO REY, PUERTO RICO 00017 APARTADO 11488 / SANTURCE, PUERTO RICO 00910 / TELEPONO: 767-8181



### QUANTUM LABORATORIES, INC.

ANALYTICAL SERVICES Q.P.O. BOX 1629 • SAN JUAN, PUERTO RICO 00936 (809), 7937/288

July 11, 1990

B & B WOODS Avin: Mr. Guillermo Buch P.O. Box 3849 Hato Rey, PR 00919-3849

#### ANALYSIS REPORT

HEARPER DESCRIPTION

Soil, taken from lot at Saint Just Industrial Park

SAMPLE IDENTIFICATION

40,255 Point A-1 (6 in)

40,256 Point A-2 (14 in)

Point B-1 (4 in) 40,257

40,258 Point B-2 (12 in) 40,259 Point C-1 (4 in)

DATE SAMPLE SUBMITTED

July 12, 1990

SAMPLED BY

E. Garcia, J. R. Ramirez Quantum Laboratories, Inc.

ANALYSIS REQUESTED

Argenic, Chromium, Copper, pH

SAMPLE #	As (ppn)	Cr (ppm)	Cu (pra)	Hg
40,265	0.76	0.34	0.46	8,34
40,256	0.73	0.15	0.40	5.90
40,257	0.80	0.09	0.51	8.45
40,258	0.68	0.11	0.38	7.62
40,259	0.29	0.03	0.07	6.15
and the second s	1			

Page 2 B /ND B WOODS Samples: 40,255/40,256/40,257 40,258/40,259

Notes:

Samples were taken from excavations performed at locations shown in the attached map. Numbers shown in the limitity column refer to the depth (in inches) at which the samples were taken. Samples were submitted to the Extraction Procedure described by Method 1310 in SW-846 (EPA). Analysis of metals were performed by Atomic Absorption. Limits for Arsenic and Chromium according to SW-846 are 5.0 and 5.0 ppm, respectively. Copper is not considered in SW-846.



B&B Woods / Centro Industrial St. Just SHED SHED BUILDIND 0 7 2 9/37:2 50000

Market State (Control of the Control of the Control

# CUANTUM LABORATORIES, INC.

ANALYTICAL SERVICES
G.P.O. BOX 1629 • SAN JUAN, PUERTO RICO 00936.
(809) 793-7288

July 31, 1990

B AkD B WOODS Attn: Mr. Guillermo Bush P. O. Eox 3849 Hato Rey, PR 00919-3849

RE: ANALYTICAL PROJUCCOL FOR SOIL SAMPLES TAKEN FROM EXCAVATIONS AT THE SIDE LOCATED IN SAINT JUST INDUSTRIAL PARK.

Samula Preservation

Samples were taken into wide-mouth glass jars and kept at 4 deg. Cent. until the extraction.

#### Extraction Procedure

Samples were submitted in a consecutive manner to the extraction procedure method 1310 described in SW-846. this procedure requires that a weighed sample be mixed with distilled water the pH adjusted to 5.0 or less with acetic acid. Then the mixture is stirred using a mechanical stirrer for 24-hours while checking the pH occasionally. After 24-hours the mixture is filtered and the filtrate analyzed for metals.

Analysis

The extract from the above procedure in then subjected to Atomic Absorption or other analysis to determine the metal content. The analytical procedure used is that described for each particular metal in SW-846.

J. Roberto Ramirez, Ph. D.

74

### QUANTUM LABORATORIES, INC.

ANALYTICAL SERVICES
G.P.O. BOX 1629 • SAN JUAN, PUERTO RICO 00936
(809) 793-7288

July 31, 1990

B AND B WOODS
Artn: Mr. Guillermo Bush
P. O. Box 3849
Hato Rey, PR 00919-3849

#### ANALYSIS REPORT

SAMPLE DESCRIPTION

SAMPLE IDENTIFICATION DATE SAMPLE SUBMITTED SAMPLED BY

ABALYSIS REQUESTED

Water taken from unused septitaken located at lot in Saint Just Industrial Park

40,260

July 12, 1990

E. Garcia, J. R. Ramirez

Quantum Laboratories

: Arsenic, Copper, Chromium

PARAMETER

Arsenio

Chromium

Copper

UNITS RESULT

mg/L LT 0.01

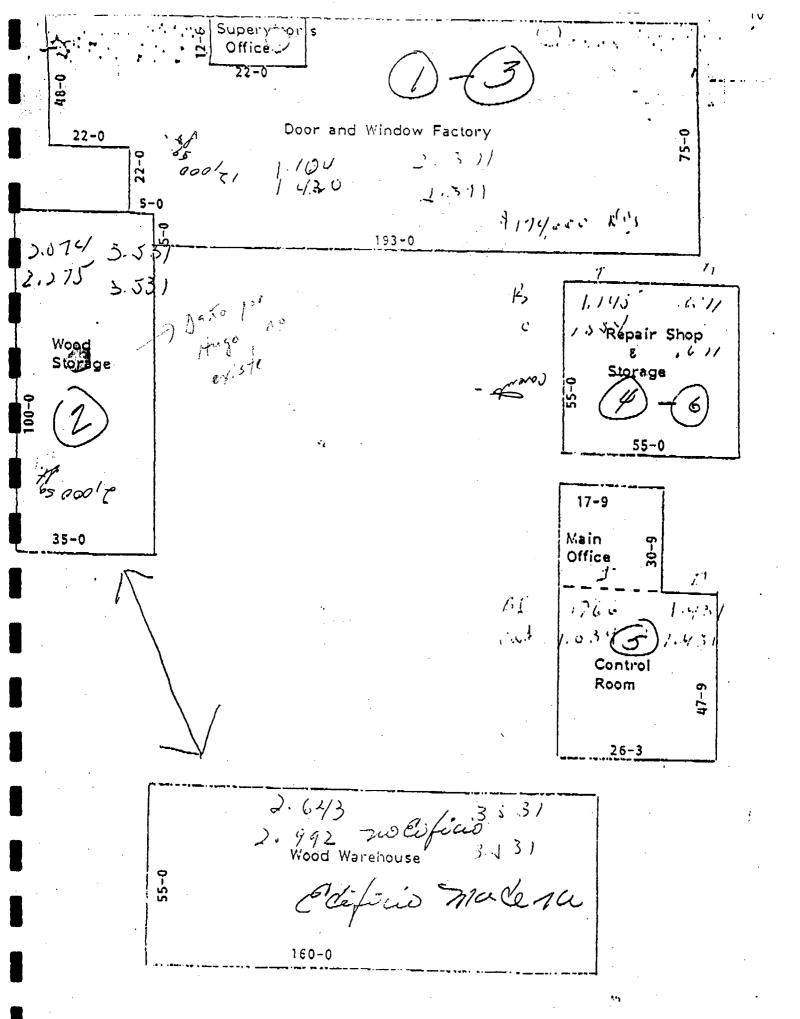
mg/L 0.01

mg/L 0.02

Note:

Sample was taken from the tank with a boiler. The water sample was analyzed directly.





ROBERT F. McCLOSKEY ASSOCIATES





23 de julio de 1990

#### **MEMORANDO**

Α

: Sr. Genaro Torres Jefe, División

Emergencias Ambientales

P/C

Ing. Francisco Claudio

Director

Area Calidad de Aire

DE

Milagros Santos

Directora

Laboratorio Ambiental

ASUNTO

Informe Resultados Análiticos

Muestreo Especial

Le someto el informe de resultados analíticos realizados a muestras procedentes de las inmediaciones de la industria B&B Wood Treating, Inc. Urbanización Saint Just, Trujillo Alto.

El muestreo fué solicitado por la División de Emergencias Ambientales. Las muestras fueron entregadas a la Sra. Miriam Estrada por el Sr. Rodrigo Díaz de la División de Muestreo de Agua el 24 de mayo de 1990.

Las estaciones se identificaron como sigue:

- 1- Pozo Séptico
- 2- Dique

Los parámetros requeridos fueron: Arsénico, Cromio total y cobre.

Las muestras tenían una apariencia física turbia y color gris- verdoso.

Es de notar que las muestras dan resultados muy altos en los tres metales analizados, los cuales son de concentraciones que sobrepasan por mucho lo establecido en el Reglamento de Estándares MEMORANDO A: Sr. Genaro Torres

de Calidad de Agua con los siguientes valores: arsénico 50 ug/1, cobre 40 ug/1 y cromio total 50 ug/1.

Los análisis fueron realizados dentro de los límites de tiempo especificados por EPA y siguiéndose los métodos oficiales.

c.c. : Sr. Santos Rohena

Rescurage, No-automily
cudy: B+ Billood Freating Inc.
Alescarga No-Autourika cuiy: B+B Mood Fresting Suc Ush Industrial Said Just Sugiller Altr Date received: 24 mayo 1990 , Sugiller Altr
Remested by

#### ENVIRONMENTAL QUALITY BOARD OFFICE OF LABORATORIES

WATER QUALITY STUDIES REPORT

Report Date: 9 Julio 1990
Revised by: MER.

Sta. No.	DO mg/l	BOD mg/l	COD mg/l	TÓC mg/l	Oil & Grease mg/l	Phen- olics ug/l	Surf.	Hg ug/l	Pb ug/l	Cđ ug/l	Zn ug/l	Cu ug/l	Cr Total ug/l	Cr <sup>+6</sup>	Fe ug/l	Ag ug/l	As ug/l	Se ug/l			
/											,	2,266	9,808	i			11,174		:		
2												125,138	209,150				32,852				
				·														·			
											·										
								-													
								-													
			1													-					

Peliscargo, Mo-Gistoria
tudy: B+B Wood Leating byc.
Iliscarga No-autorizada  tudy: B+B Wood Scealing Inc.  Who Industrial Saint Just, Trupllo alto ate received: 24 mayo 1990
consisted by

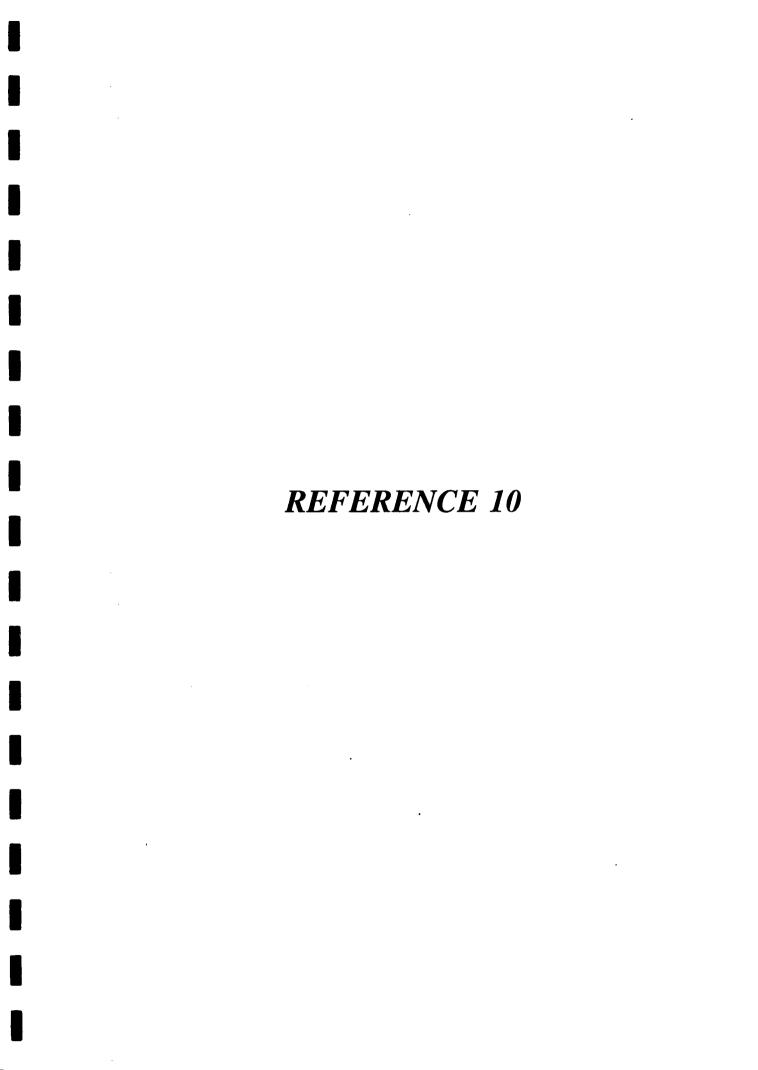
## ENVIRONMENTAL QUALITY BOARD OFFICE OF LABORATORIES

WATER QUALITY STUDIES REPORT

Report Date: 9 Julia 1990

Revised by: 4491

ita.	Time	Se- quen- tial No.	Type of Sample	Color Pt/Co.	Turbi- dity NTU	TDS mg/l	TSS mg/l	Total Solids mg/l	Set. S ml/l	рН	Cond umbos Salinit	Hard. Total	alk.	Cl.	CN ug/1	F ug/l	N03-N N02-N	NH3-N ug/1	TKN ug/l	Total P ug/l	SO <sub>4</sub> ug/1	S ug/l
1.	1321	1	gub								<b>1</b>						ug/l			ug/1		-
2	13:25		gut.												-							-
	_		V 	:										<del></del>								
		-																· (				
			•																			
											·											
																			.5			
			:																			
						.																<del></del>



Rico

### PUERTO RICO

### Ground-Water Resources

Ground water, which is an important resource in Puerto Rico, constitutes about 22 percent of the total water used on the main island. On the south coast, 50 percent of the water used is withdrawn from aquifers. Along the north coast, wells supply about 20 percent of the domestic, commercial, and industrial water demands. During the last 10 years, development of ground-water sources for public-water supply has increased at an annual rate of about 5 million gallons per day (Mgal/d). In the near future, the amount of ground water used for public supply may surpass the amount used for irrigation. Ground-water resources supply most of the water requirements for the pharmaceutical and the electronics industries, the two largest industrial employers. Ground-water withdrawals in 1980 for various uses and related statistics are given in table 1.

### GENERAL SETTING

The geology of Puerto Rico is characterized by a complex central core consisting mostly of volcanic and intrusive rocks that are flanked on the north and south by clastic sediments and limestone. The volcanic rocks are predominately ashy shale, agglomerate, and tuff, most of which are thoroughly indurated. Clastic sediments, which are composed predominately of poorly sorted mixtures of gravel, sand, and finer materials, predominate along the south coast where a series of coallesced alluvial fans has formed a coastal plain that averages 3 miles (mi) in width and extends eastward a total of 38 mi from Ponce. The limestone has been eroded in most parts of the south coast. At the north coast, the limestone has been subjected to extensive dissolution, which has produced a mature karst topography.

Recharge to the aquifers in Puerto Rico, including the offshore islands, is derived mainly from precipitation. Average annual rainfall is 75 inches (in.) on the main island but its location within the northeast trade winds and its mountainous interior influence the areal distribution. Near the coast on the north shore, annual average precipitation is 60 in.; it increases to 100 in. at the divide and decreases to an average of 35 in. along most of the south shore. The offshore islands receive an average annual rainfall of from 40 to 45 in. About 55 percent of the average annual rainfall is lost to evapotranspiration on the main island, and as much as 95 percent, on the offshore islands. Depending on local geology and physiography, recharge to the aquifers ranges from as much as 20 in. in the north-coast limestone belt to 5 in. or less in the alluvium-filled areas of the south coast and on the island of Vieques.

### PRINCIPAL AQUIFERS

The principal aquifers in Puerto Rico are the North Coast limestone aquifer, the South Coastal Plain aquifer, the alluvial valley aquifers, and the Esperanza and Resolución Valley aquifer (on the island of Vieques). These aquifers are described below and in table 2; their areal distribution is shown in figure 1.

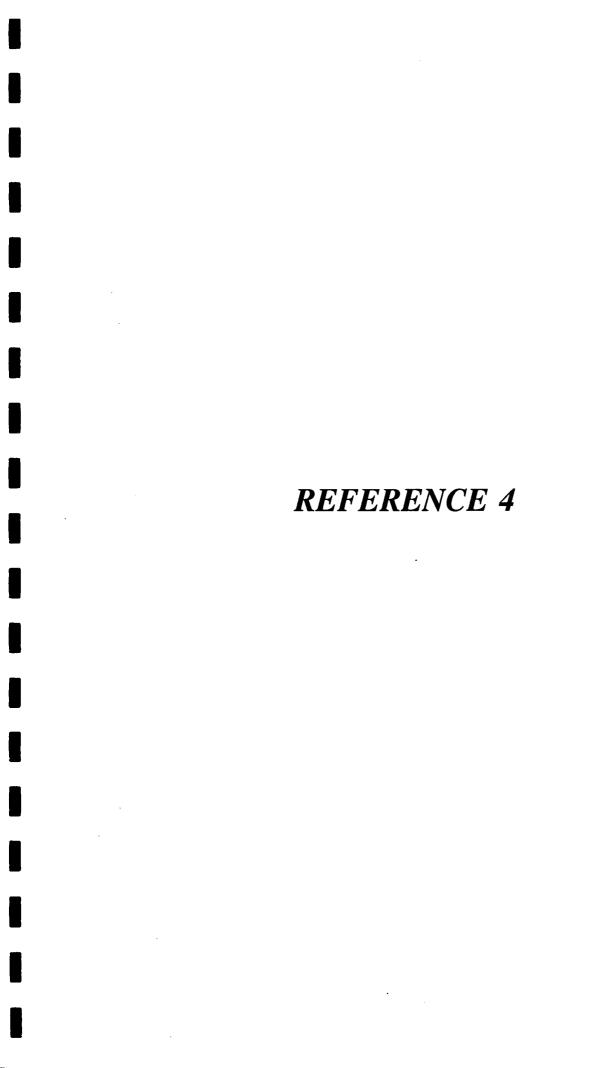
Water quality of Puerto Rico's principal aquifers generally is suitable for most uses. Ground water is of a calciumbicarbonate type in most areas, and contains dissolved-solids concentrations ranging from 200 to 500 milligrams per liter (mg/L). However, the Esperanza and Resolución Valley

#### Table 1. Ground-water facts for Puerto Rico

[Withdrawal data rounded to two significant Tgu ad may not add to totals because of independent rounding. Magaild = million gallons per day; gal/d = gallons per day. Soirce Solley, Chase, and Mann, 1983]

Population served by ground water	:0
Number (thousands)	853
Number (thousands) Percentage of total population	26
From public water-supply systems:	
Number (thousands) Percentage of total population	640
Percentage of total population	20
From rural self-supplied systems:	
From rural self-supplied systems: Number (thousands)	213
Percentage of total population	6
Freshwater withdrawals, 1980	
Surface water and ground water, total (Mgal/d)	1,100
Ground water only (Mgal/d)	246
Percentage of total	22
Percentage of total excluding withdrawals for	
thermoelectric power	35
Category of use	,
Public-supply withdrawals:	
Ground water (Mgal/d)	75
Percentage of total ground water	30
Percentage of total public supply	22
Per capita (gal/d)	117
Rural-supply withdrawals:	
Domestic:	
Ground water (Mgal/d)	18
Percentage of total ground water	6
Percentage of total rural domestic	42
Per capita (gal/d)	85
Livestock:	
Ground water (Mgal/d)	3.0
Percentage of total ground water	1
Percentage of total livestock	50
Industrial self-supplied withdrawals:	
Ground water (Mgal/d)	57
Percentage of total ground water	23
Percentage of total industrial self-supplied:	
Including withdrawals for thermoelectric position	3
Excluding withdrawals for thermoelectric page 1	21
Irrigation withdrawals:	
Irrigation withdrawals: Ground water (Mgal/d)	100
Irrigation withdrawals:	100 40

aquifer in Vieques contains a sodium bicarbon of water with a dissolved-solids concentration as high as 70° mg/L. Excessive iron (0.14 mg/L) and manganese (1.4 mg, L) oncentrations are common in wells on the east coast of remain island (Gómez-Gómez and Guzmán-Ríos, 1982). Soltwater upconing and intrusion are potential threats through but the coastal areas but do not represent a general water-quality problem appears to be contamination by organic compounds. In 1983 wells in three public-supply well fields that were found to be contaminated with volatile organics were closed (Cuzmán-Ríos and Quiñones-Marquéz, 1984); two of the well fields tapped the North Coast limestone aquifer and the othe topped the South Coastal Plain aquifer.

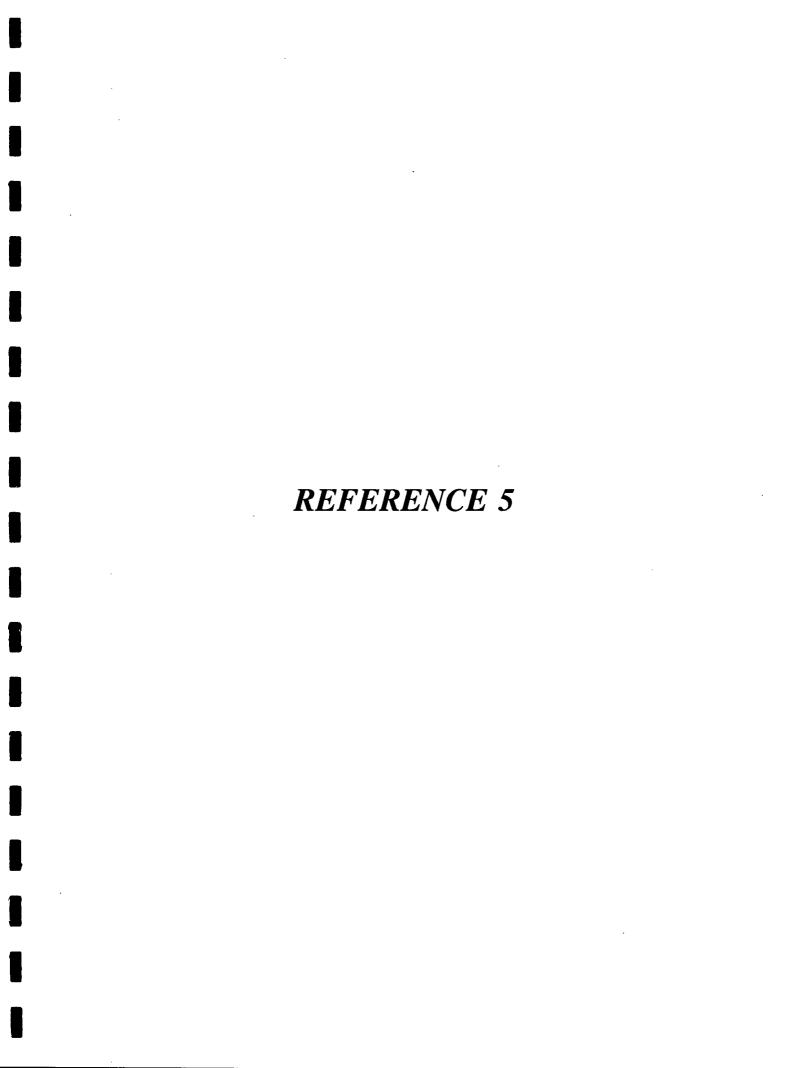


## PR ENVIRONMENTAL QUALITY BOARD SUPERFUND PA/SI PROGRAM

Ref. 4

PERSONAL INTERVIEW NOTE

CONTROL NO: PRD 987379344	DATE: May , 1992	TIME: 1330
DISTRIBUTION: B and B Woodtr	eating and Processing II	
BETWEEN: Genaro Torres León	OF:PREQB Emergency Response Office	PHONE: (809) 766-2823
AND: Jorge L.	Quiñones Pizarro	
DISCUSSION: B and B Wo	oodtreating II Visit	
Mr. Genaro Torres said that he per	formed an inspection to the	ne site due to a
complaint of dead fisher in the Blasina cre	eek. The day of the inspec	ction he found a dike
and a septic tank filled with a green color	ed water. Also in the cree	k he found many
solid wastes and CCA concentrate contain	ers. He also mentioned th	nat in one occasion
was told about two local childrens who us	sed the dike as a swimmin	g pool.
	-	
There are photos and a written rep	ort from the inspection bu	t he couldn't found it.





(809) 755-4545 755-4658 Telex: 365-385 A.B.M1L

B.B. Wood Treating and Processing, Co. Inc.

ERNESTO GUISASOLA Sales Manager

Puerto Rico 0075 Carr. 848, Km. 1.

The Bown & Zear &

5-29-90

101-234 215

P.O BOX 3849 HATO REY STA., PUERTO RICO 00919-3849 TEL. (809) 782-9446 – FAX (809) 793-7725

CHECK NO.

1227

PAY

TO THE ORDER
OF

Banco
Santander Puerto Rico
Sucurial De Pieral Park Hato Rey, Puerto Rico

Sucurial De Pieral Park Hato Rey, Puerto Rico

PAGNADO FACTURA 00001 POR CONCEPTO DE TRANSPORTACION DE AGUAS DE QUINICAS PARA LA PLANTA EN CATANO-----2400.00

CTA. 421

122

### **INVOICE**

C.O.D. 00001

**J∠O, INC.** 

..O. BOX 4909 CAROLINA, P.R. 00628 PH. 762-1230

S D & B Wood Treatment S Saint Just Ind. Park I Saint Just, P.R.

DATE SLSMN ORDER NO. ORD. DATE SHIPPED VIA TERMS INVOICE NO. INV. DATE INV. NO.

5-21-90 Verbal ITEM/DESCRIPTION/SERIAL NO.

QUANTITIES UNIT UNIT PRICE AMOUNT

Transportación de aguas de chimicas para ser tratadas en la planta de trataminetos de B&B en Cataño.

80,000 gadones de aguas transportadas. 0 \$0.03¢ por gal

80,000 @ \$0.03¢...... \$2,400.00

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT

05/21/90

 NON-TAXABLE
 TAXABLE
 SALES TAX
 FREIGHT
 MISC.
 INVOICE TOTAL

 2,400.00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00
 .00

を いちてい のの のの かいかい





### JZOS SEPTICOS

SERVICIO Y MANTENIMIENTO DE PLOMERIA

Ave. Campo Rico GP 11 - Urb. Country Club, Río Piedras, P. R. 00924

P.O. Box 4909 Carolina, P.R. 00628

Tels. Country Club: 750-1000 Tel. Bayamón: 787-3147 762-4142	Tels. Rio Piedras:	769-5467 768-2833
SU RECIBO DE PAGO  CLIENTE B + B WOOD REATMENT  DIRECCION AUE EMBACADERU FINAL	y 14,	19 90
DIRECCION AUE EMBACADERU FINAL	, CATAN	0
DESCRIPCION	GALONES	COSTO
POZO LACIADO DE LANQUE		
(TRANSFER) 8,000 GALS.		
PLANTA DE TRATAMIENTO :		
CISTERNA:		
OTROS:		
Condiciones de pago: DE CONTADO	TOTAL •	-
NOTA: No firme sin untes leer y examinar el contenido de e		u firma

NOTA: No firme sin untes leer y examinar el contenido de este documento. Su firma al final indica que Usted esto conforme con la labor realizada, la cual debera pagar en efectivo y en el acto al terminar el trabajo. De hacer pago con cheque Usted se compromete a no impedir el pago del mismo. Si lo hiciese o si dicho cheque resultase sin fondos Usted pagara los daños mas gastos, costos y honorarios de abogados en faso de reviama - cion judicial o extrajudicial.

Acepto Conforme:

Servicio Sanitario Publico — A toda la isla , Limpiamos Plantas de Tratamientos Trampas de Grasa — Cisternas y Otros



4269

## JZOS SEPTICOS



SERVICIO Y MANTENIMIENTO DE PLOMERIA Ave. Campo Rico GP 11 - Urb. Country Club, Río Piedras, P. R. 00924 P.O. Box 4909 Carolina, P.R. 00628

els, Río Piedras:	768-2833
116,	19
ATANO	
GALONES	∞s <sub>T</sub> o
TOTAL •	
	GALONES

NOTA: No firme sin antes leer y examinar el contenido de este documento. Su firma al final indica que Usted esto conforme con la labor realizada, la cual debera pagar en efectivo y en el acto al terminar el trabajo. De hacer pago con cheque Usted se compromete a no impedir el pago del mismo. Si lo hiciese o si dicho cheque resultase sin fondo. Usted pagara los daños mas gastos, costos y honorarios de abogrados en caso de reclamación judicial o extrajudicial.

Acepto Conforme;

Servicio Sanitario Publico — A toda la isla, Limpiamos Plantas de Tratamientos Trampas de Grasa — Cisternas y Otros



SERVICIO Y MANTENIMIENTO DE PLOMERIA

Ave. Campo Rico GP 11 - Urb. Country Club, Río Piedras, P. R. 00924

P.O. Box 4909 Carolina, P.R. 00628

Tels. Country Club: 750-1000 Tel. Bayamón: 787-3147 762-4142	Tels. Río Piedras:	769-5467 768-2833
SU RECIBO DE PAGO	116,	19 90
CLIENTE DAD WOOD REATMENT	7	
DIRECCION ACE EMBARCADERO FINAC,	CATANO	<u> </u>
DESCRIPCION	GALONES	совто
POZO: /ACIADO DE /ANQUE		
(TRANSTER) 8,000 CARS		
PLANTA DE TRATAMIENTO		
CISTERNA:		
OTROS :		
	<u> </u>	
Condiciones de pago: DE CONTADO	TOTAL 🔷	
NOTA: No firme sin antes leer y examinar el contenido de es al final indica que Usted esto conforme con la labor realizada, efectivo y en el acto al terminar el trabajo. De hacer pago con mete a no impedir el pago del mismo. Si lo hiciese o si dicho c Usted pagara los daños mas gastos, costos y hororarios de abo cion judicial o extrajudicial.	la cual debera pap cheque Usted se c heque resultase/si	gar en compro— n fondos

Servicio Sanitario Publico — A toda la isla, Limpiamos Plantas de Tratamientos Trampas de Grasa - Cisternas y Otros

4271

ZOS SEPTICOS



SERVICIO Y MANTENIMIENTO DE PLOMERIA

SERVICIO Y MANTENIMIENTO DE PLOMERIA

Ave. Campo Rico GP 11 Urb. Country Club, Río Piedras, P. R. 00924

P.O. Box 4909 Carolina, P.R. 00628

Tels. Country Club: 750-1000	els. Río Piedras:	768-2833
SU RECIBO DE PAGO  CLIENTE DE BUUD TREATMENT  DIRECCION FLE EMBARCADERO FINAL	1 17, CATAÑO	19 90
DESCRIPCION	GALONES	costo
POZO VACIADO DE TANQUE		
PLANTA DE TRATAMIENTO:		
CISTERNA:		
OTROS:	+	
Condiciones de pago: DE CONTADO	TOTAL •	,
NOTA: No firme sin antes leer y examinar el contenido de al final indica que Usted esto conforme con la labor realizace efectivo y en el acto al terminar el trabajo. De hacer pago comete a no impedir el pago del mismo. Si lo hiciese o si dich Usted pagara los daños mas gastos, costos y honorarias de accion iudicial o extrajudicial.	on cheque Usted o cheque resulta	se compro- se sin fondos

Servicio Sanitario Publico — A toda la isla, Limpiamos Plantas de Tratamientos

Trampas de Grasa — Cisternas y Otros

. .....

.110

4272

## JZOS SEPTICOS



SERVICIO Y MANTENIMIENTO DE PLOMERIA

Ave. Campo Rico GP 11 - Urb. Country Club, Río Piedras, P. R. 00924

P.O. Box 4909 Carolina, P.R. 00628

and the same of th	320	
Tels. Country Club: 750-1000 Tel. Bayamón: 787-3147 762-4142	Tels. Río Piedra	769-5467 768-2833
SU RECIBO DE PAGO  CLIENTE DA BUDGO TRADA	AJ 17,	19 _
DIRECCIONALLE EMBARCADERO FINA	R. CATH	NO
DESCRIPCION	GALONES	
POZO: /ACIADO DE ANDOLE	0.120.123	costro
The DE MINUE		<del> </del>
(TRANSFOR) & NOOGOVE		ļ
PLANTA DE TRATAMIENTO		
CISTERNA:		
CIOILLIA,		
OTROS:		1
OTROS:		<del> </del>
		<del>  </del>
Condiciones de pago: DE CONTADO	TOTAL -	<del>  </del>
NOTA: No firme sin antes leer y examinar el contenido de es		
The Control esto contorme con la laboration in	1	
	eados en caro do a	i iondos
cion judicial o extrajudicial.		eciama -
Acepto Conforme:	(1 yhu	rond
Servicio Senitario Publico — A toda la ista di inciana	<del>/-</del>	

Servicio Sanitario Publico — A toda la isla, Limpiamos Plantas de Tratamientos Trampas de Grasa — Cistarnas y Otros

4273

## **POZOS SEPTICOS**



SERVICIO Y MANTENIMIENTO DE PLOMERIA Ave. Campo Rico GP 11 - Urb. Country Club, Río Piedras, P. R. 00924 P.O. Box 4909 Carolina, P.R. 00628

Tels. Country Club: 750-1000 Tel. Bayamón 787-3147 762-4142	Tels, Río Piedras	769-5467 768-2833
SU RECIBO DE PAGO  CLIENTE DA DOOD TREATMENT OF	1 (8,	19 90
DIRECCION VE: EMBARCADEM FINAL, (	ATANO	
DESCRIPCION	GALONES	COSTO
POZO: PACIANO DE PANGLE		
PLANTA DE TRATAMIENTO:		
CISTERNA:		
ni fo Marie		
OTROS:		
Condiciones de pago: DE CONTADO  NOTA: No firme sin antes leer y examinar el contenido de este	OTAL •	Gema

NOTA: No firme sin antes leer y examinar el contenido de este documento. Su firma al final indica que Usted esto conforme con la labor realizada, la cual debera pagar en efectivo y en el acto al terminar el trabajo. De hacer pago con cheque Usted se compromete a no impedir el pago del mismo. Si lo hiciese o si dicho cheque resultase sin fondos Usted pagara los daños mas gastos, costos y honorarios de abogados en caso de reclamación judicial o extrajudicial.

Acepto Conforme:	
------------------	--

Servicio Sanitario Publico — A toda la isla , Limpiamos Plantas de Tratamientos Trampas de Grasa — Cisternas y Otros

4274

## JZOS SEPTICOS



SERVICIO Y MANTENIMIENTO DE PLOMERIA

Ave. Campo Rico GP 11 · Urb. Country Club, Río Piedras, P. R. 00924

P.O. Box 4909 Carolina, P.R. 00628

Tels. Country Club: 750-1000 Tel. Bayamón: 787-3147	els. Río Piedras:	769-5467 768-2833
SU RECIBO DE PAGO  CLIENTE DA B WOOD REATURNT	1, 18,	19 90
DIRECCION HE CUBARCADERO MWAC,	(ATA)	)0
DESCRIPCION	GALONES	COSTO
POZO VACIADO DE LANGUE		
(MANSFER) 8,000 GALS		
PLANTA DE TRATAMIENTO		-
CISTERNA:	ares	)
OTROS:		
Condiciones de pago: DE CONTADO  NOTA: No firme sin antes leer y examinar el contenido de es al final indica que Usted esto conforme con la labor realizada efectivo y en el acto al terminar el trabajo. De hacer pago con mete a no impedir el pago del mismo. Si lo hiciese o si dicho o Usted pagara los daños mas gastos, costos y honorarios de aboción judicial o extrajudicial.	, la cual debera cheque Usted cheque resultas ogados en caso	pagar en se compro— e sin fondos
Acepto Conforme:		<del></del>

Servicio Sanitario Publico — A toda la isla , Limpiamos Plantas de Tratamientos Trampas de Grasa — Cisternas y Otros REFERENCE 11

## GEOLOGIC MAP OF THE CAROLINA QUADRANGLE, PUERTO RICO

By Watson H. Monroe

Prepared in cooperation with the COMMONWEALTH OF PUERTO RICO DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS INVESTIGATIONS SERIES Published by the U.S. Geological Survey, 1977 G

GEOLOGIC MAP OF THE SAN JUAN QUADRANGLE, PUERTO RICO

By M. H. Pease, Jr., and W. H. Monroe

Prepared in cooperation with THE COMMONWEALTH OF PUERTO RICO DEPARTMENT OF NATURAL RESOURCES

MISCELLANEOUS INVESTIGATIONS SERIES Published by the U.S. Geological Survey, 1977 G

PREPARED IN COOPERATION WITH
THE COMMONWEALTH OF PUERTO RICO
ECONOMIC DEVELOPMENT ADMINISTRATION
INDUSTRIAL RESEARCH DEPARTMENT

## 

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-657

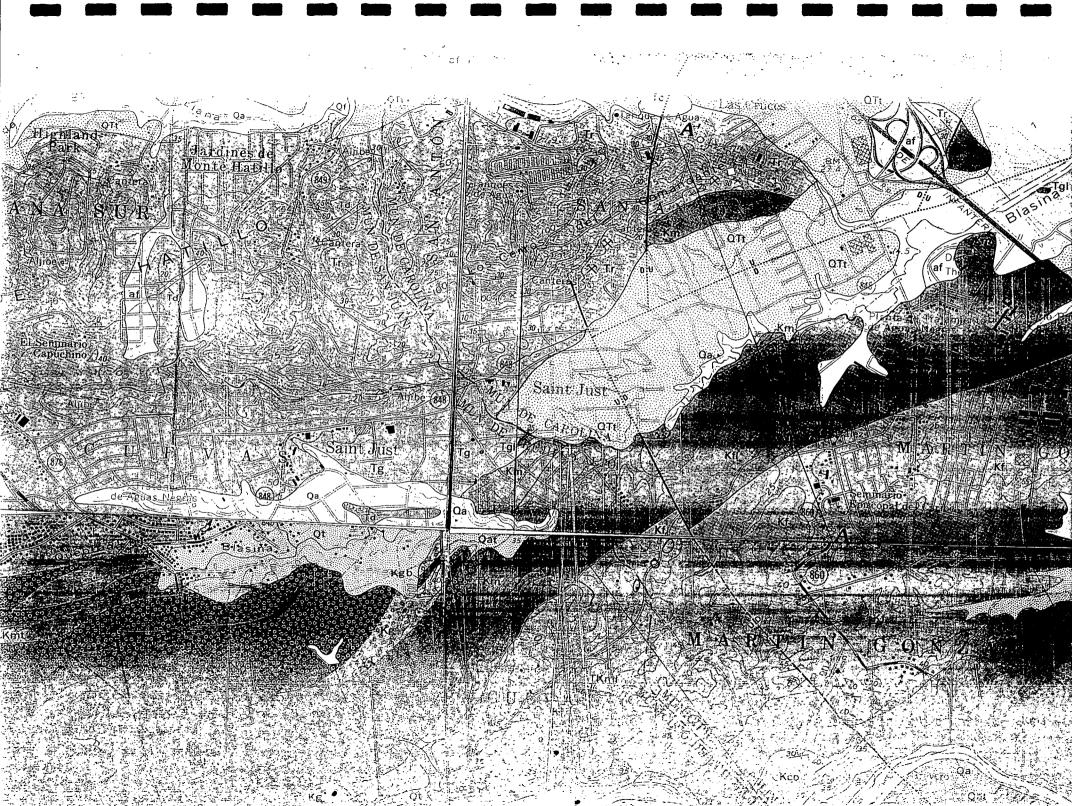


PREPARED IN COOPERATION WITH
THE COMMONWEALTH OF PUERTO RICO
ECONOMIC DEVELOPMENT ADMINISTRATION
INDUSTRIAL RESEARCH DEPARTMENT

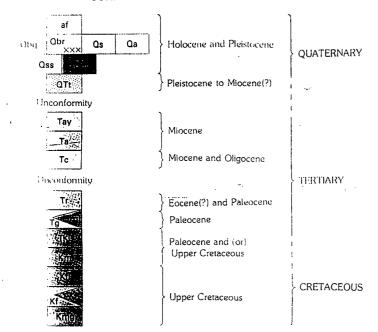
GEOLOGIC MAP OF THE AGUAS BUENAS QUADRANGLE, PUERTO RICO
By
Maurice H. Pease, Jr.

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-479





### CORRELATION OF MAP UNITS



### DESCRIPTION OF MAP UNITS

ARTIFICIAL FILL (HOLOCENE AND PLEISTOCENE)—Material from various sources hauled in and dumped in low, swampy places to provide foundations for-housing and industrial development

BEACH DEPOSITS (HOLOCENE AND PLEISTOCENE)—Fine to medium sand on beaches and coastal dunes; composed largely of rounded shell fragments mixed with minor quantities of fine quartz grains and fine grains of volcanic rock fragments. Generally less than 10 m thick

15s

tho

Oss

BEACH DEPOSITS (HOLOCENE AND PLEISTOCENE)—Sand on beaches and abandoned beach ridges composed largely of fine quartz grains mixed with minor quantities of shell fragments and volcanic rock fragments. Grains of magnetite concentrated in thin lenses at the mouth of the Rio Grande de Loiza (Guillou and Glass. 1957, p. 281, tables 1, 2, plate 15). Generally less than 10 m thick

BEACH ROCK (HOLOCENE AND PLEISTOCENE)—Beach sand, predominantly composed of shell fragments generated by calcium carbonate. Generally 1 in or less thick

SWAMP DEPOSITS (HOLOCENE AND PLEISTOCENE)—Sandy muck and clavey sand; some areas underlam? Deat (Roberts and others, 1942). Much of the area have covered by artificial all (af) was originally swamp deposit. Jenerally less than 20 m thick.

ALLUVIUM AND RIVER-TERRACE DEPOSITS (HOLOCENE AND PLEISTOCENE)—Sand, clay, and sandy clay, beds of sand containing gravel at sides of Rio Grande de Loiza. Thickness vanable, possibly as great as 100 m.

SILICA SAND (HOLOCENE AND PLEISTOCENE)—Very pure quartz sand, generally more than <sup>90</sup> percent silica (Meyerhoff and Trazier, 1945), but locally contains organic matter. Underlain near La Ceramica by Quaternary clay formerly used in the manufacture of terracotta tile (Cadilla, 1958). Thickness ranges from 1–3 m

EOLIANITE (HOLOCENE AND PLEISTOCHINE)—Friable to consolidated, crossbedded calcareous golian sandstone composed of fine to coarse grains or shell fragments and quartz. Maximum thickness about 20 m

### GEOMORPHOLOGIC NOTES

The boundary between the interior highlands of Puerto-Rico and the northern coastal plain is just north of the southern horder of the Carolina 'quadrangle. The rocks in the interior highlands comist langely of volcanic and intrusive rocks and associated sedimentar rocks (Pease, 1968 and Seiders, 1971); these are of Earl, Cretaceous to Eocene age. North of the boundary the coastal plan consists largely of alluvial deposits and limestone.

The Rio Grande de Loiza, which has the largest drainage basin in Puerto Rico, flows from the hilly interior into the northern coasial plain at the southern edge of the quadrangle. The headwaters of the river are in intrusive rocks, largely quartz diorite of the Scallacenzo batholith, which have weathered to clayey quarts sand. Flence the flood plain of the river is underlain by alluvium composed largely of quartz sand, but containing cobbles of regrederived from the formations through which the river flows on its a aumonth from the batholith.

The river has had a complex Quaternary history in the coastal plain. Apparently it first flowed northward from Carolina between the alluvial fan and terrace deposits of barrio Sabana. Abajo and malinestone hills of barrio Hoyo Mulas. The river entered the same Boca de Cangrejos, as is shown by the deposits of fine quantis sand that form the beach toward the southwest. Eventually, deposition of the abundant sediment filled this channel, and the river was diverted to the east and flowed in a complicated serious meanders, partly through the limestone hills northwest of Same Barbara. The old courses of the river are now marker or installationed meanders and os-bow lakes.

Eventually all distributaries flowing foward. Both de Canage of were blocked by silling and the river was again diverted enstward to the virinity of Canovanas and Santa Barbara, where it now flows for remarkably straight course north to the coast at Loiza Adda. As it are a west of Boca de Canagrejos the beach deposits again Loiza Addea are composed of quantz sand brought in by the river. Quantis very rare in the deposits along the Playa de las Tres Palmiras, the beach between Punta Vacia Talega and Boca de Canagrejos, which i composed largely of finely ground shell fragments.

The straight course of the river from Santa Barbara to the coast has never been satisfactorily explained. The earliest maps of Puerto Rico, made in the seventeenth century show the river with a present course; and there is no record of straightening the channel of the river, so apparently the straight course is a natural one. Natural levees on both sides of the river rise about 3 m. Swamp deposition both sides of the river are Lagrons that have been gradually silter as the river overflowed its natural levees during floods, having our Lagrana la Torrecilla and Lagrana de Piñones as remnants.

in contrast to the Rio Grande de Loza, Quebrada Blasma flower northward in a meandering course until it was straightened by dredging in the early 1960's in order to drain its flood plain and housing projects.

### ECONOMIC AND ENGINEERING GEOLOGY

The only inetalliferous deposits observed in the statequadrangle are small quantities of magnetic concentration lenses in quartz beach sand at the mouth of the Bio Grande dis-Guillion and Glass, 1957, p. 281, tables 1, 2, plate 151 contained 14 percent magnetic, and other thin lenses statetic between. The tenses are serious, to weeken, to the contained constitute an explosion resource cannot constitute an explosion resource.

### CLAY

A deposit of day used at La Ceramica terraconal positions described by Cadilla (1958). Another much smaller to be possibly suitable for backs, dops out at the side of Puerto Neo 360. This time west southwest of the plaza at Canovana.

FilGH TERRACE AND ALLUVIAL-FAN DEPOSITS (PLEISTOCENE TO MIOCENE?)—Mostly sandy clay and clavey sand containing a few pebbles of volcame rock. North and south of Los Cerros del Comandante, the allowal fan deposits contain many angular fragments of silt-stone. Generally less than 10 m thick

OTt

 $T_{C}$ 

Tgi

Kfl

AYMAMÓN LIMESTONE (MIOCENE)—White its very pale orange, locally pale-yellow and grayish-pins, massive to thick-bedded, very pure fossiliferous limestone, generally indurated on surface by secondary cementation into finely crystalline rather dense limestone. Contains thin lenses of calcitic dolomite on the westernmost limestone hill at Loiza Aldea. Commonly solution riddled and weathered on surface into dense limestone having abundant sharp spires many centimeters high. Exposed thickness 50-100 m.

AGUADA LIMESTONE (MIOCENE)—Alternating beds of indurated, slightly quartziferous, very pale orange to pink, fine calcarenite and grayish-orange to very pale orange clavey and chalky limestone; some beds of soft sandy marlstone. Thickness about 50 m

CIBAO FORMATION (MIOCENE AND OLIGOCENE)—Rubbly sandy very pale orange to grayish-orange limestone interbedded with gray sandy clay and fossiliferous calcareous claystone. Composition of lower part is similar to edipacent pebbly sandy clay in high terrace deposits (QTt). Thickness

RIO PIEDRAS SILTSTONE (EOCENE? AND PALEO-CENE)—Well-stratified, thin-bedded, partly laminated, mostly tuffaceous siltstone and fine-grained sandstone. In fresh exposures the formation is medium gray, but in most outcrops it is weathered to yellowish, reddish, and greenish gray and brown. Local layers of yellowish-brown crumbly

 FUJARACANAL FORMATION (PALEOCENE) — George purplish or reddish-gray basaltic flow breedia, generally weathered to clayey sand containing abundant grains of hornblende. Pinches out toward east. Thickness 0-270 m

day. Thickness 200-700 m

GUARACANAL FORMATION, LIMESTONE MEMBER (PALEO-CENE)—Medium- to thick-bedded, medium-light-gray limestone containing abundant algal fragments. Thickness about 10-20 m

INTRUSIVE ROCKS (PALEOCENE AND (OR) UPPER CRETACEOUS)—Quartz diorite, light-gray rock containing phenocrysts of plagioclase and quartz; in southeast corner of quadrangle includes coarse-grained diabase and diabase porphyry, probably a sill. May include some to a property belonging to Martin Gonzalez Lava

MONACILLO FORMATION (UPPER CRETACEOUS)—Volcanic mudistone and sandstone, generally reddien draw. Outcrops in quarties: I km inormeast of St. Just Jac than bedded gravish-orange mudistone and siltstone, overlain directly by Rio Pledras Siltstone. Thickness\*0–100 m

FRAILES FORMATION, LEPROCOMIO MUDSTONE MEMBER (UPPER CRETACEOUS)—Thin- to thick-bedded mediumgray calcareous mudstone. Thickness 300-400 m

FRAILES FORMATION (UPPER CRETACEOUS)—Grayish-green medium- to very thick bedded volcanic sandstone, in part pebbly; and fine to medium volcanic breccia. Thickness 700–800 m

### LIMESTONE

Hard dense algal limestone of the Guaracanal Formation crops out south of Route 3 in a narrow belt from 1.5 to 2 km west of the plaza at Canovanas and on the south side of a ridge about 2 km east of the plaza at Carolina and immediately north of the Rio Grande de Loiza. This limestone will make excellent concrete aggregate and is pure enough to be used as a source of lime.

The Aymamón Limestone consists largely of soft chalk, but most of it is very pine calcium carbonate that has been dissolved at the surface and reprecipitated as a carapace of very hard dense limestone. The surface case-hardened part can be excavated and used as fill or as terrazo chips, but the softer parts, soon reached in quarries, are not suitable. The entire unit is suitable for the manufacture of high-quality lime, except for some thin lenses of calcitic dolomite present on the westernmost hill at Loiza Aldea.

FILL
The Aguada Limestone consists of 30–40 m of alternating beds of rather tough, slightly earthy limestone and of very calcareous sandy claystone. This limestone makes very good fill and has been used

as road metal on many of the cane-field roads.

The thin-bedded Rio Piedras/Siltstone that forms the Cerros del Comandante in barrio San Anton has been extracted from several quarries for coarse fill.

### SAND AND GRAVEL

Virtually unlimited supplies of sand and gravel are available in the alluvial deposits of the Rio Grande de Loiza in the area bounded by Carolina, Hoyo Mulas, and Canovanas. Sand and gravel have been excavated extensively in the valley south of Carolina.

The low dunes south of the beach between Punta Maldonado and Punta Vacia Talega have been excavated as a source of building sand, but the quantity is limited. This sand is composed principally of shell fragments.

Large quantities of quartz sand are available in the beach ridges located more than a kilometer inland in the area south of Punia Vacia. Talega. Additional large quantities of somewhat carbonaceous sand are found in the long ridge about 600 m south of Punia Maldonado, in the ridges south of Piñones, and at Islote deducat Penez.

### INUNDATIONS

All areas of the quadrangle shown as underlain by alluvium or swamp are subject to frequent floods.

The areas of alluvium at the sides of the Rio Grande de Loiza between Canovanas and Loiza Aldea are natural levees. They are higher than land farther from the river, but they are formed by the denosit of alluvium from the over waters during high floods when the velocity of the flood water drops as the river spreads beyond its channel. These strips of higher land are particularly susceptible to floodling.

-- 1

FRAILES FORMATION, LAVA FLOWS (UPPER CRETA-CEOUS)—Basaltic to andesitic pillow lava

MARTÍN GONZÁLES LAVA (UPPER CRETACEOUS)--Grayish-green to dusky-green porphyritic andesitic basalt containing abundant phenocrysts of plagioclase: includes some interbedded volcaniclastic rock. Some of material mapped as intrusive rock in the southeast corner of the quadrangle may actually be Martin González Thickness 0-300 m

Contact—Approximately located

Fault-Approximately located: dotted where concealed: queried where doubtful. U. upthrown side: D. downthrown side. Arrows show direction of relative movement Sinke and dip of bedding. Dip value shown

X Sand and gravel pit

7

Quarry

### REFERENCES

Cadilla, Jr. F., 1958. Geology of the Carolina clay deposit. Rico: Puerto Rico Dept. Indus. Research Minerologi-Geology, Bull. 6, 31 p.

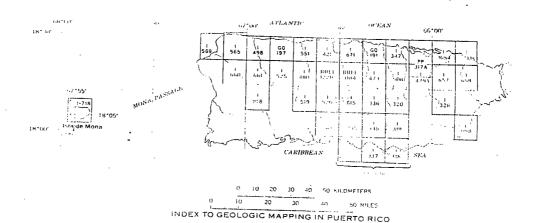
Guillou, R. B., and Glass, J. J., 1957, A reconnaisance of the sands of Puerto Rico: U.S. Geol. Survey Bull. 1041, 104 273-305.

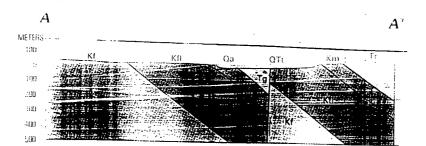
Meyerhoff, H. A., and Frazier, J. E., 1945, Glass sand and a 19 industry in Puerto Rico: Mining Technology, v. 9, no. 6, 1000

Pease, M. H., Jr., 1968. Cretaceous and lower Tertiary strang, new of the Naranjito and Aguas Buenas quadrangles and nair. areas, Puerto Rico: U.S. Geol, Survey Bull, 1253, 57 p.

Roberts, R. C., and others, 1942. Soil survey of Puerto Ric-Dept. Agriculture, Soil Survey Rept., ser. 1936, no.  $8,\,500\%$ Seiders, V. M., 1971, Cretaceous and lower Tertiany stratignaple of

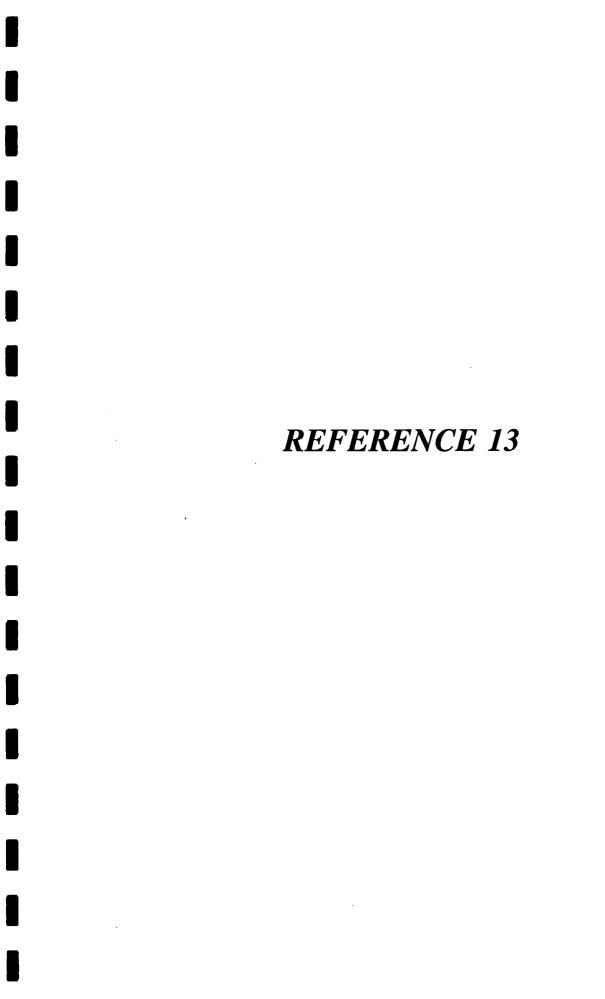
the Gurabo and El Yunque quadrangles, Puerto Rico:  $0.8^{\circ}\,\mathrm{cm}^{\circ}$ Survey Bull. 1294F. 58 p.





REFERENCE 12

## PR ENVIRONMENTAL QUALITY BOARD Ref. 12 SUPERFUND PA/SI PROGRAM **TELECON NOTE** DATE: CONTROL NO: TIME: PRD 987379344 April 29, 1992 0859 B and B Woodtreating and Processing II DISTRIBUTION: PHONE: (809) BETWEEN: OF: PRASA Mr. Lucindo Ortiz Water Production Area 756-2534 AND: Jorge L. Quiñones DISCUSSION: Wells in San Juan Area The Manuel A. Perez 1, Manuel A. Perez 2, Truman, Miguel Such, Universidad I and Universidad 2 wells are not in service.



# PR ENVIRONMENTAL QUALITY BOARD SUPERFUND PA/SI PROGRAM

Ref. 13

TELECON NOTE

CONTROL NO: PRD 987379344	DATE: April 29, 1992	TIME: 0859
DISTRIBUTION: B and B Woodtr	eating and Processing II	
BETWEEN: Pedro Hernández	OF: PRASA, Carolina Engineering Dept.	PHONE: (809) 257-3180
AND: Jorge	L. Quiñones	
DISCUSSION: Wells in	Carolina Area	
Jardines de Carolina, Villa Fontana	I, Country Club, Saint Ju	st are not in service.
Villa Fontana II well is used only during	emergencies. The last tim	e this well was used.
During the hurricane Hugo emergency two	years ago. At his time	Villa Fontana II well
lack pump.		
		t
	· · · · · · · · · · · · · · · · · · ·	

REFERENCE 14

## PR ENVIRONMENTAL QUALITY BOARD Ref. 14 SUPERFUND PA/SI PROGRAM **TELECON NOTE** DATE: TIME: CONTROL NO: PRD 987379344 January 23, 1992 10:35 AM **DISTRIBUTION:** B and B Woodtreating OF:PRASA San Juan PHONE(809) BETWEEN: Mr. Lucindo Ortíz Water Production 250-1268 Department AND: Jorge L. Quiñones DISCUSSION: Status of drinking water wells in San Juan Metropolitan Area Mr. Ortíz said that the only well used in the San Juan Metropolitan Area is Las 400 (masas) well, located in Carolina city, but only during emergencies. All other wells in metropolitan area are out of service; stand-by or used occasionally only to inject chlorine to the water in the public water systems, and regularly are not connected to the systems.

REFERENCE 15

## PR ENVIRONMENTAL QUALITY BOARD Ref. 15 **TELECON NOTE** SUPERFUND PA/SI PROGRAM DATE: TIME: CONTROL NO: 10:05 am PRD 987379344 January 22, 1992 **DISTRIBUTION:** B and B Woodtreating and Processing PHONE: BETWEEN: OF: PRASA Dr. Nicolino Liberatore 758-4585 San Juan Area AND: Jorge L. Quiñones DISCUSSION: Wells in the San Juan Metropolitan Area The metropolitan area do not depend on drinking water coming from wells. They are used only as back-up or during emergencies.



FORM NO. 9-1904-A Revised February 1987

REMARKS (CBO6)	DATA TYPE (C804) (Place an 'A' (active), on 'I' (inactive), or an 'O' (inventory) in the appropriate box)  W. W. DW DW Cont.mt. C	AGENCY USE (C803)  ACTIVE. Inactive. Inventory  ONV  DATE INVENTORIED  (C711)  ONV  DATE INVENTORIED  (C711)  ONV  DATE INVENTORIED  (C711)  ONV  ONV  ONV  DATE INVENTORIED  (Picce 'Y' in the appropriate box)  (C711)  Well	AGRAPHIC GRAPHIC SETTING (C19)  (C19)	ALTITUDE	MAP (C14)  MAP (C15)	STATE (C7)  LAND NET (C13)	LONGITUDE CON CON CONTROL CONT	STATION NAME  (C12)	AGENCY USIGIS (C1) SITE ID NO. (C5)	U.S. DEPT. OF THE INTERIOR GEOLOGICAL SURVEY WATER RESOURCES DIVISION GROUND-WATER SITE SCHEDULE General Site Data	Coded by Checked by Entered by
----------------	--	--	--	----------	----------------------	----------------------------	--	---------------------	-------------------------------------	--	--------------------------------

	LOCATION MAP NAME	LATITUDE (DEGREES)	LONGITUDE (DEGREES)	SITE NAME	OWNER		PRIMARY USE OF SITE	PRIMARY USE OF WATER
	JUAN	182436	0660311	POZO HYDE PARK	HIGHWAY AUTHORITY		0	U
	MAUL	182254	0660338	JIMENEZ #16 TW	USGS		Τ,	U
	JUAN	182308	0660425	SEARS-CUPEY #15 TW	USGS		Τĺ	U
-	JUAN	182318	0660425	CEMENTERIO #14 TW	USGS		T	U
SAN	JUAN	182349	0660326	JARDIN BOTANICO(1) #13	USGS		Т	U
SAN	JUAN	182351	0660322	MAX BOHR(1) #12 TW	USGS		т	U
SAN	JUAN	182351	0660322	MAX BOHR(2) #12 TW	USGS		T	Ū
SAN	JUAN \	182406	0660326	JARDIN BOTANICO(2) #13	USGS		Ť	Ū
SAN	JUAN	182406	0660347	JARDIN BOTANICO(3) #19	USGS		T	Ü
SAN	JUAN	182417	0660427	LAS AMERICAS(1) #10 TW	USGS		Τ	Ü
	JUAN	182417	0660427	LAS AMERICAS(2) #10 TW	USGS		Т	U
	JUAN	182418	0660406	LOS OLMOS #11 TW	USGS		T	U
	JUAN	182422	0660345	UNIV. GARDEN #09 TW	USGS		Т	U
	JUAN	182435	0660527	SALUD MENTAL(1) #05 TW	USGS		T	U
SAN	JUAN	182435	0660527	SALUD MENTAL(2) #05 TW	USGS		Τ	U
SAN	JUAN	182437	0660405	PARQUE FUENTES(1) #07 T	USGS		Т	υ
	JUAN	182437	0660405	PARQUE FUENTES(2) #07 T	USGS		т	Ū
SAN	JUAN	182441	0660449	RESERVA #04 TW	USGS		Т	Ū
	JUAN	182443	0660415	MUNOZ MARIN(1A) #08 TW	USGS	·	Т	Ü
SAN	JUAN	182443	0660415	MUNOZ MARIN(1B) #08 TW	USGS		T	Ü
	JUAN	182443	0660415	MUNOZ MARIN(1C) #08 TW	USGS		Т	U
	JUAN	182445	0660434	ALSACIA(1) #06 TW	USGS		т	U
	JUAN	182445	0660434	ALSACIA(2) #06 TW	USGS		T	U
	JUAN	182453	0660641	US NAVY #01 TW	DEFENSE DEPARTMENT		т	U
SAN	JUAN	182453	0660641	US NAVY #D2 TW	DEFENSE DEPARTMENT		Т	U
	JUAN	182453	0660641	US NAVY #03 TW	DEFENSE DEPARTMENT		Т	U
	NAUL	182500	0660433	MUNOZ MARIN(2) #03 TW	UŚGS		T	U
	JUAN	182511	0660454	LA ESPERANZA(1) #02 TW	USGS		T	U
	JUAN	182511	0660454	LA ESPERANZA(2) #02 TW	USGS		Т	U
SAN	JUAN	182531	0660659	USGS BUILDING #652 WELL	USGS		T	U
	JUAN	182352	0660142	POZO VASBURG	VASBURG		U	U
	JUAN	182415	0660309	UPR FRONT WELL	UNIVERSIDAD DE PUERTO RICO		U	U
SAN	JUAN	182420	0660702	POZO SAN MIGUEL	SAN MIGUEL, MANOLO (DIED) VDA. SAN MIGUEL, MARY KEEN		U	U
SAN	NAUL	182420	0660725	WOLF WELL	WOLF, A.G. (judge)	1	υ	U
SAN	JUAN	182421	0660234	POZO UPR #01	UNIVERSIDAD DE PUERTO RICO 🥣		U	U
	NAUL	182431	0660538	POZO SALUD MENTAL	US NAVY SALUD MENTAL		Ü	Ų
SAN	JUAN	182447	0660724	FT. BUCHANAN #06 WELL	DEFENSE DEPARTMENT		U	U
SAN	NAUL	182450	0660540	US NAVY #03 WELL	US NAVY		Ü	Ũ

DATA TON ACTIVE & ADDIN

					<b>.</b>		
	LOCATION MAP	LATITUDE	LONGITUDE	•	,	PRIMARY USE OF	PRIMARY USE OF
	NAME	(DEGREES)	(DEGREES)	SITE NAME	OWNER	SITE	WATER
SAN	JUAN	182450	0660540	US NAVY #03 WELL	SALUD MENTAL	U	U
SAN	JUAN	182455	0660618	POZO CAFE RICO	CAFETEROS	ŭ	Ü
SAN	JUAN	182508	0660229	FAIRBANKS WELL	FAIRBANKS CORP.	ŭ	ŭ
SAN	JUAN	182511	0660711	PR CEMENT #05 WELL	PR CEMENT CORP.	ŭ	Ü
SAN	JUAN	182527	0660246	POZO VICENT	VICENT, JOSE	ŭ	Ü
	JUAN.	182527	0660408	POZO 3 MONJITAS #01	TRES MONJITAS DAIRY	U	U
	JUAN	182529	0660555	RIMCO WELL	GENERAL EQUIPMENT CORP.	Ū	Ü
	/ NAUL	182532	0660332	POZO DEL BANCO DE PONCE	BANCO DE PONCE	Ũ	Ū
	JUAN	182647	0660429	POZO CORONA #01	CORONA BREWING CORP.	W	F
SAN	JUAN	182326	0660315	POZO EST. EXP. UPR	ESTACION EXPERIMENTAL UPR	W	н
	JUAN	182440	0660304	POZO AUX. MUTUO #03	HOSPITAL AUXILIO MUTUO	W	н
	JUAN	182441	0660302	POZO AUX. MUTUO #02	SUCN. AUXILIO MUTUO	w	н
	JUAN	182452	0660227	POZO LA COTORRA	PONS, AMADO	W	I
	JUAN	182324	0660318	POZO LAS CASCADAS	ESTACION EXPERIMENTAL UPR	W	J
SAN	JUAN	182348	0660350	POZO ORCHIDEARIO	ESTACION EXPERIMENTAL UPR	W	N
	JUAN	182352	0660352	POZO PLANTA PILOTO	ESTACION EXPERIMENTAL UPR	W	N
	JUAN	182357	0660128	POZO PAMCOR INC.	PAMCOR INC.	W	N
	JUAN	182510	0660708	PR CEMENT #02 WELL	PR DEVELOPMENT CORP.	W	N
	JUAN	182510	0660708	PR CEMENT #03 WELL	PR CEMENT CORP.	W	N
SAN	JUAN	182520	0660649	POZO MONTALVO #02	PR DEVELOPMENT CORP.	W	N
	JUAN	182521	0660643	PACKING WELL	PACKING UNLIMITED	w	N
SAN	JUAN	182521	0660648	POZO MONTALVO #01	P.R. DEVELOPMENT CORP. MONTALVO, J.F.	W	N
SAN	JUAN	182525	0660407	AMERICAN STD. BRANDS WEL		W	N
SAN	JUAN	182440	0660723	FT. BUCHANAN #10 WELL	DEFENSE DEPARTMENT	w	P
SAN	JUAN	182428	0660247	UPR BACK WELL	UNIVERSIDAD DE PUERTO RICO	w	U
SAN	JUAN	182440	0660303	POZO AUX. MUTUO #01	SOC. AUXILIO MUTUO	w	Ü
SAN	JUAN	182510	0660713	PR CEMENT #04 WELL	PR CEMENT CORP.	w	Ü
SAN	JUAN	182533	0660258	GREEN SPOT WELL	BORINQUEN PASTEURIZERS	w	u
SAN	JUAN	182541	0660252	POZO TRANSPORTACION	GOBIERNO INSULAR	w	Ü

DATE. 0/01/90 GWSI DATA FOR ACTIVE ANDON WELLS IN PUERTO RICO

				•	į.			
LOCATION Map Näme		LATITUDE (DEGREES)	LONGITUDE (DEGREES)	SITE NAME	C	OWNER	PRIMARY USE OF SITE	PRIMARY USE \ OF WATER
CAROLINA		182515	0655941	CAMPO RICO #01 TW	USGS		т	υ
CAROLINA		182318	0655851	POZO SAN ANTON #02			U	-
CAROLINA		182322	0655853	POZO SAN ANTON #01			Ū	-
CAROLINA		182524	0655923	POZO ITURREGUI			U	-
CAROLINA		182231	0655402	TECHNICAST WELL	TECHNICAST CORP./	·	U	U
CAROLINA		182239	0655643	LILLY FRONT WELL	ELI LILLY IND.		U	U
CAROLINA		182243	0655627	LILLY PR-01 WELL	ELI LILLY IND.		U	U
CAROLINA	<b>Y</b>	182246	0655641	LILLY BACK WELL	ELI LILLY IND.		U	U
CAROLINA		182259	0655759	POZO LEDERLE	PARKE DAVIS "		U	U
CAROLINA		182315	0655621	POZO MIRO #01	MIRO , RAFAEL		U	U
CAROLINA		182347	0655442	POZO FESA	FESA		U	U
CAROLINA		182501	0655649	POZO GONZALEZ	GONZALEZ , ANIBAL		W	-
CAROLINA		182344	0655931	POZO EL COMANDANTE	EL COMANDANTE		W	I
CAROLINA		182232	0655632	DODGE COPPER #02 WELL	PHELPS DODGE COPPER		W	N
CAROLINA		182249	0655501	POZO LA MINA	LA MINA CORP.		W	S
CAROLINA		182311	0655626	POZO MIRO #02	MIRO , RAFAEL		W	s
CAROLINA		182534	0655245	POZO ALVAREZ #02	ALVAREZ , JORGE		W	S

PAG. 22

AUTORIDAD DE ACUEDUCTOS Y ALCANTARILLADOS
OFICINA RECURSOS DE AGUA

INVENTARIO DE POZOS

```
FICHA ACTUAL IZACIÓN: MAYES TOUR RECORD EDDES NO PECHA CENSTRUCCION:
   WURUKE WEL PLYOU ELLCARTO MIXIDA
                                                                            te : Diener Viese
   PROFUNDIDAC (PIES)

PUEBLO: GUAYNARD

PARTICULAR PROFUNDIDAC (PIES):

PROFUNDIDAC (PIES):

PROFUNDICAC (PIES):

PR
    OINAMICO:
                                          FFC FA:
                PRODUCCION (GPM)
    ORIGINAL: 200 ... LECHA:
    ACTUAL :- O FECHA:
    FORMA DE MEDIRE
        FORMACION CEOLOGICA:
                                                          CONTAMINANTES AS COMUNES (PPM)

CONTAMINANTES

FECHA

NITRITO:

NITRATO:
      CLORURO:
                                                           MANGANESC:
                                                                                                                            SULFATC:
      HIERRO :
      TOS
                                                             HARD :
                                                                                                                             TURE
             OBSERVACIONES: ABANDONACO OTROS-NO EXISTE NADA.
POZO NUMERO: 47WOORS ALLE TO THE TOTAL STATUS: RESERVAL CONECTAGO ....
  FECHA ACTUAL 12 AGTON: MAYES RECORD CODE: 4 FECHA CONSTRUCCION: 15MAR68
    NOMBRE DEL PCZG "UNIVERSICAC" PR I
   PUEBLO: RID PIETRA BARRIO : HATO REY CENTRAL
REGION: SAN JUAN LATITUD : 18-24-16
TUNA : SAN JUAN LENETTUS: 15-03-08 EL
   REGION: SAN JUAN
ZUNA : SAN JUAN
                                                                                                                           - ELEVACION(PIES):
   LARGO COLUMNA DE LA LEGMBA (PIES):
                                                                                  140 CAPACIDAD ESPECIFICA (GPM/PIES):
                                                                                               DIAMETRO
   PROFUNDIDAD(PIES): 285
  NIVEL (PLES)
ESTATION: 42 FECHA: 15MAR68
DINAMICO: 1GE FECHA: 15MAR68
                                                                                         PI RORACION
                                                                                                                                JURERIA
                                                                                                                                                                        LIFC
                                                                                                                                0=112.16
0=140.12
                                                                                                                                                                     LISA
                                                                                              0-180 16
                                                                                             80-285 12
                                                                                                                                                                       PERFORADA
    PRODUCCION (CPM)
                                                                                                                                135-285-10
   URIGINAL: 3.00 FECHA: 15MAR68
   ACTUAL : 0 FECHA:
    FORMA DE MEDIR:
                       FORMACION GEOLOGICA: 25 AR RJ-20 AR LIMO FING-15 STLUCEA-43 AR
            L'IMO VD-4C AR SILICEA BE-20 AR SILIGEA GR
                                                             CENTAMINANTES MAS COMUNES CPPM)
    CENTAMINANTES MAS COMUNES LIPAS

CONTAMINANTES FECHA CONTAMINANTES FECHA

CLORURO: 31 21MAR68 NITRITO 2 COT 21MAR68 NITRATO: 35 21MAR68

HIERRO 2 .05 21MAR68 MAÑGANESO: 0 21MAR68 SULFATO: 25 21MAR6E
      TOS = 128 21MAR68 -- :
            DBSERVACIONES: 40 AR GR MC AR VC-85 AR ARC-ACTUALIZADO 27-ENE-86.
```

resign - fait dead		o de comecalità de la companya de la		erans , ma
	zi-nograsi- yzilooj Fzcha gltual laaliun- maysb	La photographic	STATUSE ABANCENALLICIUS - 40 - E LICHA CENSTRUCCIUN:	
7件"%"。上二	NOMBRE DEL PEZE: SEARS PUETERS SAN JUAN REGION: SAN JUAN ZEÑA : SAN JUAN EARSO COLUMNA DE LA ECMBAI	OTECTE TO CADA	-40° -18 - ELEVACIUNIPIESI: 50 FIRAN ESPECTETAAGPHAPIESI:	
	PROFUNDIBAD(PIESJ:	PEREORA	LAMETRO CIGNIO TUBERIA TIPO	
7 (1) (2) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	PRODUCCION (GPN) ORIGINAL: 250 FECHA: ACTUAL : 0 FECHA: FORMA DE MEDIR:			
117 U U U U U U U U U U U U U U U U U U	CONTAMINANTES FECHA	CENTAMINANTES MAS C	CMUNES (PPM)  EECHA CONTAMINANTES FECHA  NITRATO:	
7 22 24 25 25 26 26 26 26 26 26 26 26 26 26 26 26 26		MANGANESO:	SULFATG:	*********************
* N 1701 The second of the sec	ZO NUMERO: 2-7WWC01 FECHA ACTUALIZACION: MAY85 NOMBRE DEL PCZG: TAUMAN		STATUS: EPERACIÓN:	
	PUEBLO: SAN JUAN REGION: SAN JUAN ZONA : SAN JUAN LARGO COLUMNA DE LA ECMBA() PROFUNDIDAD(PIES):	PIES)= 70 CAPA	a y construir a sa a construir de la construir	

ESTATICO: F.ECF.A: MICO: FECHA: PRODUCCIEN (GPM) DINAMICO:

ORIGINAL: 700 FECHA: ACTUAL : 0 FECHA:

FORMA DE MEDIR: FORMAÇION GEOLOGICA:

CENTAMINANTES MAS COMUNES (PPM) CONTAMINANTES FECHA NITRATG: SULFATC: CONTAMINANTES CLORURO: HIERRO: CONTÂMINANTES FECHA NITRITO :

COSERVACIONES: ON OPERACIEN-27-ENE-86. ACTUALIZACO

```
recha acitaciane cont white: ! Reducht bode: - recha constitución: caracet,
 NOMBRE DEL PEZU: 2 MANUEL A PEREZ
                               EARRIC - ORIENTE
 PUEBLG: SAN JUAN
 REGION: SAN JUAN LATITUD : 18-24-39
ZONA : SAN JUAN LONGITUD: 66-02-00 ELEVACION(PIES): 50
LARGE COLUMNA CE LA EGNEA(PIES): 50 GAPACIDAD ESPECIFICA (GPÄZPIES): 3
 PROFUNDIDAD(FIES): 225 DIAMEIRO NIVEL (PLES) PERFORACION TUBERTA
                                                                         TIFO
 ESTATICO: 3 FECHA: 22FE867 0-225 12
GINAMICO: 75 FECHA: 22FE867
PRODUCCION (CPM)
                                                      0-24 12
                                                    24-104 12
                                                                          PERFORADA
 ORIGINAL: 250 FECHA: ZZFEB67
 ACTUAL : G FECHA:
 FORMA DE MEDIR:
   FORMACION GEGLOGICA: 2 CV BA RJ AM GR AR 7 P.L CAL AM-15 BA AN G
                          R AR-35 PI GR-27 TO AZ GR-105 PI GR AM
                           CENTAMINANTES MAS COMUNES (PPM)
                  FECHA CONTAMINANTES FECHA CONTAMINANTES
  CLCRURO: 22 2.801C67 NITRITO = 0 2801C67 NITRATO: -09
  HIERRO: .1 2.EDIC67 MANGANESO: 0 28D167 SULFATG:
TDS : 253 2ECIC67 HARD : JURE :
     OBSERVACIONES: VENA AGUA 3G-ELIKINADO-ACTUALIZADO 27-ENE-66.
                POZO NUMERO: 47WWOOG GTROS)
 FECHA ACTUAL IZACION: MAYES RECORD CODE: 4 FECHA CONSTRUCCION:
 NGMBRE BEL PEZG: ISAGEL LA CATCLICA
 PUEBLE: SAN JUAN BARRIC : HATE REV SUR
REGION: SAN JUAN LATITUD : 18-24-27
ZONA : SAN JUAN LONGITUD: 66-63-49 ELEVACIONIPIESI: 23
 LARGO COLUMNA CE LA EGMBA(PIES): 130 CAPACID: DESPECIFICA (GFM/PIES): 20
PROFUNDICAD (FIES): 280

NIVEL (FIES)

ESTATICO: 54 FECHA: 21MAY77

C+280 8

C-260 8

LISA
 DINAMICO: J5 FECHA: ZIMAY77
   PRODUCCION (GPR)
 ORIGINAL: 200 FECHA:
 ORIGINAL: 2CO FECHA:
ACTUAL : O FECHA:
 FORMA DE MEGIRE
          PORMACION GEOLOGICA: 128 ARCILLA ARENOSA-12 PLEURA ARCILLA-24 -
                PIEDRA BOLOS-116 PIEDRA CALTZA AZUL BLANDA
                          CENTAMINANTES MAS COMUNES (PERC)
 CONTAMINANTES FECHA CONTAMINANTES FECHA CONTAMINANTES FECHA

ECLORURO: 48 20MAY77 NITRITO = 0 20MAY77 NITRITO C 20MAY77

HIERRO: 16 20MAY77 MANGANESOS C 20MAY77 SULVATO 51 20MAY77

TOS : 41 20MAY77 HARD : 209 20MAY77 CURE : 2 0MAY77
  ORSERVACIONES VINA AGUA LEO 23 GELIMINADO 27-ESTE BUZ
```

```
Para a constraint markety by the contract
  FEUDA ACTUAL IZACIOA: MAY8E
                                     RECORD CODE: 4 FECHA CENSTRUCCION:
  NUMBRE DEL POZO: CENTRY CLUEV
  PÚESLO: SAN JUAN
                                  BARRIC : SABANA LLANA NORIE
  REGION: SAN JUAN
                                 LATITUC: 18-24-45
LGNGITUD: 66-00-07 ELEVACION(PIES): 10
  ZONA : SAN JUAN
  LARGO COLUMNA SE LA EUMBA(PIES): CAPACIDAD ESPECIFICA(CPM/PIES):
PROFUNDIDAD(PIES): 98 DIAMETRO
                                      PEREGRACION TUBERIA
     NIVEL (PLES)
  ESTATICO:
              S FEETAS
                                                            ----C-6C-16
                                                                              LISA
  DINAMICO:
                    FECTA:
                                                           0-5C 10 LISA
  PRODUCCION (GPM)
                                                                50-98 10 PERFERADA
  <del>ÜKIĞINAL:</del>
               C F.ECHA:
  ACTUAL :
               O FECHA:
  FORMA DE MEDIR:
  FORMACION GEOLOGICA: 50 MRCILLA-2 ARCILLA PIEDRA GALIZA-28
                                PIEDRA CALIZA AMARILLA.
                             CONTAMINANTES MA! COMUNES (PPM)
   CONTAMINANTES FECTIA CONTAMINANTES FECHA CONTAMINANTES
              $20 0401074 -NITRITO : -001 0401074 NITRATO: -45
  CLORURO:
              G 04D1C74 MANGANESO: -.05 G4D1C74 SULFATO:
  "HIERRO :
  TDS = 2446 C4DIC74 HARD :
     OBSERVACIONES: TUBO CELLADO-ABANDENADO CLERUROS ALTOS-01-86 ACT.
POZO NUMERO: 47WW020
 FECHA ACTUAL IZACION: MAY85 " RECORD CODE: 4" FECHA CONSTRUCCION: 74
 NOMBRE DEL PCZO: ISAAC M CONZALES
 PUEBLO: SAN JUAN BARRIO : PUERTO NUEVO
REGION: SAN JUAN LATITUD : 18-24-11
                             LATITUD : 16-24-11
                         LENGITUD: 66-04-55 ELEVACION (PIES): 40
 LARGO COLUMNA DE LA EDMBA(PIES): CAPACIDAD ESPECIFICA PROFUNDIDAD(FIES): 90 C. I.A.M.E.T.R. G.
                                            CAPACIDAD ESPECIFICA (GFM/PLES): .85
  NIVEL (PIES)

STATICO: 27 FECHA: 74 0-90 20 0-36 20
DINAMICO: 83 FECHA: 74 0-20 8
 ESTATICO:
                                                          0-3C 20
                                                                           LISA
 DINAMICO:
                                                                             1 ISA
 -- PRODUCCION (CP*1
ORIGINAL: 50 FECKA:
ACTUAL : 0 FECKA:
FORMA DE MEGIR:
          FORMACION GEOLOGICA: 20 BARRO ARENOSO-30 BARRO AMARILLO ARENOSO
                           -40 BARRO ROJO EGLES.
                            CENTAMINANTES MAS CEMUNES (PPM)
 CONTAMINANTES FECHA CONTAMINANTES FECHA CONTAMINANTES FECHA CLERURO: 26.5 020C174 NITRITO: -001 020C174 NITRATO: 2.C 020C174 HITERO: 2.5 020C174 MANGANESO: -25 020C174 SULFATO: 2.5 020C174 IDS : 219 UZUCT78 HARD: TÜRB : TÜRB : CHSENVACIONGS: PICALPROC. DERON NE CENECTADO AFRICALIZATO 01-86.
```

```
RECIKE CECE: 4 FECHA CONSTRUCTIONS
     FOURA ADJUALIZATION: MAYOS
    NOMBRE DEL POZO: URB VILLA FONTANA
    PUEBLG: CAROLINA
   REGIUN: SAN JUAN LATITUD = 18-24-06 20NA : CAROLINA LONGITUD: 65-58-22
                                                                        - LATITUD = 18-24-C6
   LARGO COLUMNA DE LA COMBATPIESI: 60 CAPACIDAD ESPECIFICATGEN/PIESI:
PROFUNDIDAD(PIES): 305
NIVEL (PIES) PERFORACION IUBERIA 11FO
   ESTATICO: FECIAL
DINANICO: 47 FECHA:
                   PRODUCCION (CPA)
   URIGINAL 250 FECHA:
    FORMA DE MEDIR
      FORKACION CECLOGICA:
                                                                  CENTAMINANTES MAS COMUNES (PPM)
                                                             CONTARINANTES FECHA CONTARINANTES FECHA
      CLORURO: 25.1 GJULTE NITRITO CON CONTRATO: .012 .03JULTE
      HIERRO: CE 03JUL78 HANGANESO: O 03JUE78 SULFATO: 1.4 C3JUL78
                                 772 0311 78 HARD - 148 03JUL78 TURE :
       GUSERVACIONES: RESERVA NO CONECTADO.
NEMBRE DEL POZE: URB VILLA FORTANA
   PUEBLO: EARULINA EARRIG : VILLA FONTANA
   RECIGI: SAN JUAN LATITUD : 18-24-06

ZONA : CARGUINA LOMBA(PIES): 65-58-22 ELEVACION(PIES):
L'ARGO COLUMNA DE LA EUMBA(PIES): 60 CAPACIDAD ESPECIEICA (GEM/PIES):
   PROFU DICAG (FIES): 305 DIAMETRO TUBERIA
    ESTATICO: FECHA:
   DINAMICO: - AZ FECFA:
    PRODUCE (ON LGPM)
ORIGINAL: 2501 FECKA:
   ACTUAL E FECHA
    FORMA DE MEINIS
        FORWACION GEOLOGICA:
   CONTAMINANTES CENTAMINANTES MAS COMUNES IPPM)

CONTAMINANTES FECHA CONTAMINANTES FECHA

CEGRURO: 15 FECHA CONTAMINANTES

CEGRURO: 15
```

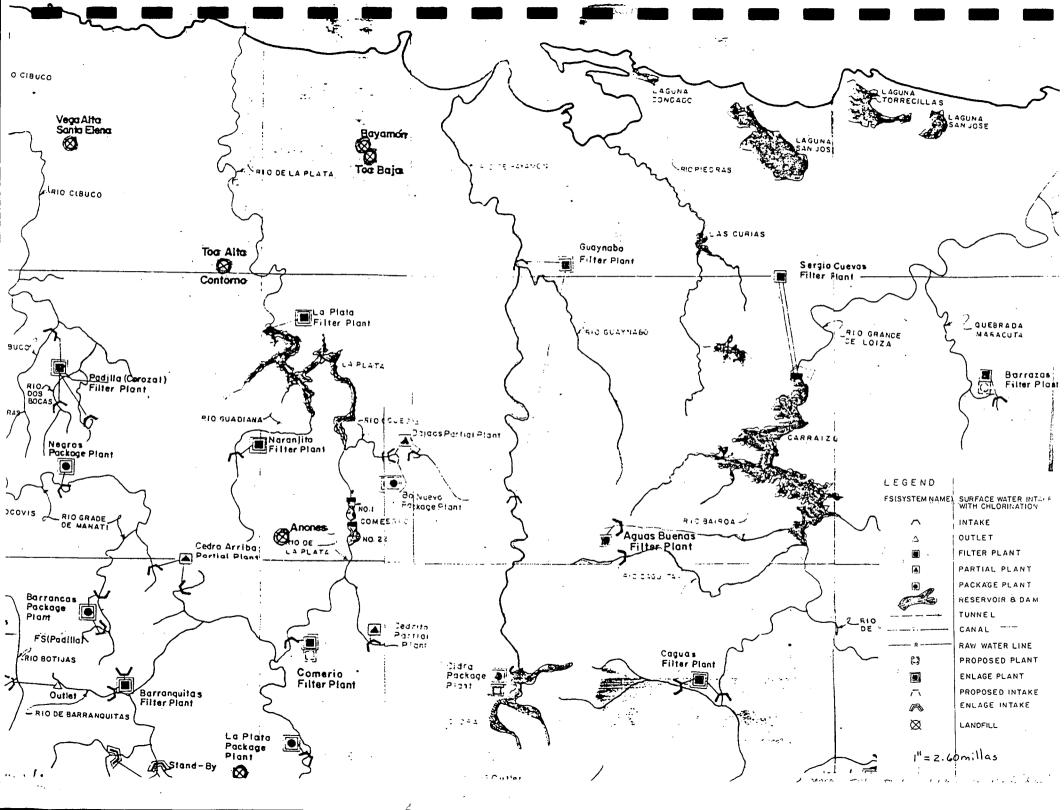
POZO NUMERO: SZAMOGIE ULTIMA: C STATUS: RESERVA NO CONECTADO FECHA ACTUALIZACION: MAY85 RECORD CODE: A FÉCHA CONSTRUCCION: NOMBRE DEL PCZO: URB VILLA FONTANA PUEBLO: CARCLINA BARRIG : VILLA FENTANA
REGION: SAN JUAN LATITUD : 18-24-06
ZUNA : CAROLINA LONGITUD: 65-58-22 ELEVACION(PIES): 16 LARGE COLUMNA DE LA ECMBATPIESI: 60 CAPACIDAD ESPECIFICATGRM/PIESI: PROFUNDIDAD(FIES): 305

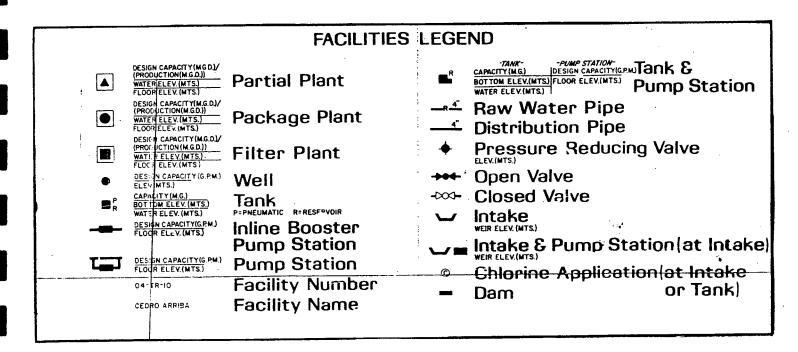
NIVEL (PIES)

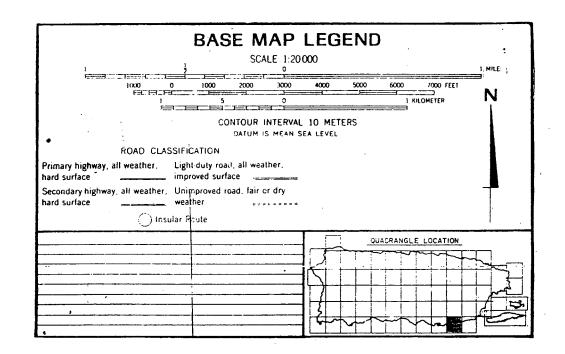
PERFORACION DIAMETRO ESTATICO: F.EC. A:
DINAMICO: 47 FECHA: PRODUCCION IGPNI GRIGINAL: 250 FIC A: ACTUAL : C FECIA: FORMA DE MEDIR: FERRACION 6 GLOCICA: CENTAMINANTES MAS COMUNES (PPM) CONTAMINANTES FECHA CONTAMINANTES FECHA CONTAMINANTES FECHA CLCRURO: 35 16S-P75 NITRITO : .CO2 19SEP75 NITRATO: 1.3 19SEF75 HIERRO: 0.4 16S-P75 MANGANESO: 0 19SEP75 SULFATC: 292 195 P75 HARD 115 1986P75 TURE : 0 1986F75 OBSERVACIONES: RESERVA NO CONECTACE. POZO NUMERO: 52WWGGIC ULTINA: C STATUS: RESERVA NO CONECTADE 18 (1) FECHA ACTUALIZACION: MAYES RECORD CODE: 4 FECHA CONSTRUCCION: NEMBRE DEL PEZE: URE VILLA FENTANA PUEELO: CAROLINA
REGION: SAN JUAN
LATITUC: 18-24-06
ZONA: CAROLINA
LONGITUE: 65-58-22
ELEVACION(PIES): 16 EARGO COLUMNA DE LA GOMBA (PIES): 50 CAPACIDAD ESPECIFICA (GEM/PIES): PROFUNDIDAD(FIES): 305 DIAMEIRG PERFORACION TUGERIA NIVEL (PIES) ESTATICO: FECHA: DINAMICO: 47 FECHA: PRODUCCION (CPK) ORIGINAL: 250 FECKA: ACTUAL TO FECHAL FORMA DE MEGIN: FORMACION GEOLOGICA: CENTAMINANTES MAS COMUNES (PPM) CONTAMINANTES FECHA CONTAMINANTES FECHA CONTAMINANTES CLORURO: 37 -24MAR77 NTITIO : 0- 24MAR77 NTIRATO: 1:5 24XAR77
HITRO: 12 4MAR77 MANGANESO: 0- 24MAR77 SULFATE: 18 24XAR77
TUS
UDSEANACIEMES: ISERVI NO DONECIALD 



PRASA FILTER PLANTS AND INTAKES IN PUERTO RICO







# COMMONWEALTH OF PUERTO RICO AQUEDUCT AND SEWER AUTHORITY

WATER SUPPLY SYSTEMS MAP
SAN JUAN

Skintingo Vazquez SVFG - 300

JAN. 1983

47

MAP NUMBER

COMMONWEALTH OF PUERTO RICO
AQUEDUCT AND SEWER
AUTHORITY

WATER SUPPLY SYSTEMS MAP
AGUAS BUENAS

Santiago Vazquez SVIG 2000.
Haherty • Giavara SVIG 2000.

AUTORIDAD DE ACUEDUCTÓS Y ALCANTARILLADOS.

JAN. 1983

48

COMMONWEALTH OF PUERTO RICO AQUEDUCT AND SEWER AUTHORITY

WATER SUPPLY SYSTEMS MAP

CAROLINA

SCIPTIOGO VÓZQUEZ SIFET SAN JUNE PURTO RICO 809-128-2333. 129-2300 AUTORIDAD DE ACUEDUCTOS Y ALCANTARILLADOS

JAN. 1983 DATE

52

COMMONWEALTH OF PUERTO RICO
AQUEDUCT AND SEWER
AUTHORITY

WATER SUPPLY SYSTEMS MAP

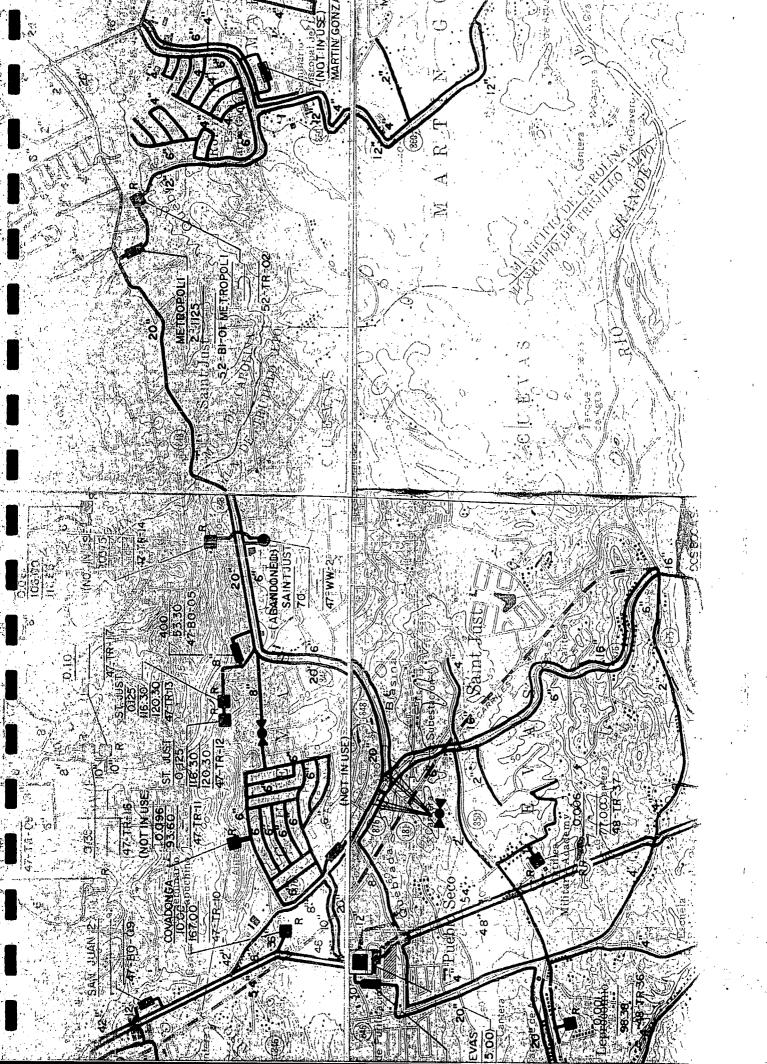
GURABO

Santiago Vazquez

Flatierty Giavaria Survey Statistics Statistics

JAN. 1983 DATE

53



- DO NOT REMOVE

## **PUBLIC WATER SUPPLIES IN PUERTO RICO, 1983**

## U.S. GEOLOGICAL SURVEY OPEN FILE DATA REPORT 84-126



Prepared in cooperation with

UERTO RICO AQUEDUCT and SEWER AUTHORITY





Figure 1. Geographic boundaries of municipios and U.S. Geological Survey code numbers.

Table 1. Population, housing units and estimated number of connections to the public water supply system, by municipio.

ر د	138) CE	NSUS	*ON**	3ER OF CO	NNECTIONS	
COOE		'	HOUSING UNITS	DOMESTIC	COMMERCIAL	INDUSTRIAL
<b>-</b>	ACJUNTAS	90	90	9.5	v	7
, ,	ACAU	31567	9734	7699	195	15
μ.	$\neg$	9	42	20	~	6.3
~*	JA 5 9	242	62	70	~	13
5.	NITO	9	33	27	~	17
\$	2	327	70	5	0	15
~	: C I	575	63	8	~	e.
m <sup>-</sup>	S	707	13	797	0	11
^	20.5	768	0.3	13	9	56
1.0	~	163	73	42	S	4
11	-	620	513	841	S	129
12	ပ္	707	6 5	69	79	54
13	2	795	528	900	•	179
14	5	4	755	617	55	21
15.	20 L	595	5	39	9	<del>د</del> ه
15	T A	524	62	28	~	110
17	Ė	109	34	75	•	2.5
12	9.	967	5.8	66	O	7
13	A	521	49	17	S	. 12
. 62	CIORA	336	90	43	<b>€</b>	2.3
21	3	382	8	31	0	22
2.2	3	321	22	99	Ò	4
23	4CZA	322	46	56	C	10
5.4	ابا 9	126	51	36	4	-
25	٩ ۵	551	23	2	9	13
26	JARD	203	3.5	42	•	62
27	43	979	31	30	^	пĊ
2.8	4444	313	3.5	93	7	52
62	AYANI	105	60	7	293	•
33	AVVA	920	33	73	m	79
31	GURABO	357	93	70	4	2
3.2	HATILLO	895	47	8	•	67
33	9148	403	45	33	C	13
24		513	02	99	4	53
3.5	ABEL	743	144	55	4	6 ,
15	JAYUYA	472	5	35	~	11

Table 1- Population, housing units and estimated number of connections to the public water supply system, by municipios. - (Continue)

9565	1927 CENSUS	s	**NUMBER OF CONNECTIONS			
30.00	WJNICIPIO	PCPULATION	HOUSING UNITS	COMESTIC	COMMERCIAL	INDUSTRIAL
. 25	141C ENFOR	359	7.7	7 4	•	
£.	٠,	5 3 9	Ğ,	5	~	3.5
\$5	LAJAS		4.3	=	a,	c
<b>,</b>	<b>∽</b>	5.76	င္ဆ	9	4	<b>~</b> ·
<del>.</del> , (	44 2 1 4 S	7 / 7	2 6	151	$^{\circ}$	′';
* i pi	*C:14	- ·	•	?;	• (	Ç ſ
7 .	7:07	76807	3643 4430	6.73	2 6 6	> °
5 5	) } !	5 2 5	, ,	5 0	. •	. c.
5.5	<b>ا</b> ا	673	21,	90,0	· ~	, ∽
**	MAUNARO	191	7	0	Š	~
0,*	3	513	0	æ	~	91
Ĉ,		919	793	9	Ç.	~
C) (	<b>~</b>	114	53	Ň	~	σ'n
-	93	361	92	9	( )	<b>.</b>
5.5	7	363	5	~	N	.9
2 3	2 \	933	23	Ξ.	_	æ
2.6	PATILLAS	777	Ç.	ž	~	2
5.5	IL A	1911	\$23	٥	72	•
<b>v</b> . (	<b>u</b> .	18304	0,	2	$\sim$	101
2.5	TUESRADILLAS	1772	6.1	2	<b>v</b> , ,	٠,
α .	z	<del>1</del> 79	٠ د	S.	S	
20	30 AN 05	3423	(i)	on i	U 1 1	\$ .
Ç.	SANA GRAND	5329	۲.	S	•	<u>~</u> '
5.1	S A S	7 79	C (	)	- 1	· ;
25	とせるない フマン	7 2 2 2	7	0, 1	5.7	<b>~</b> \ .
<b>?</b> ?	Z = 2	707	200	_		263
5.	LORENZO	1242	676	7	•	د م
\$ ?	SE BASTI	5.59	6	٠,	- (	C   (
9 .	4 ISA9		בי נ	4 (	ው የ	υ <b>′</b>
` '		,	9	?	<b>~</b> •	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
17 (7		4767		C .	^ •	<b>,</b> °
* C *	יין היין אור מיין אור		٠ د ع ر	2 5	- 0	^ <b>~</b>
, <u>r</u>	۰ <b>د</b>	, , ,			, r	: :
7.5	9 6	711	7 6	. P	347	- 57
1 6	, H	. Y Y Z	Ĉ		٠.4	
7.2	4	973	. 4	8	Š	~
7.5	400	142	32	3	*	14
5.2	0	774	57	ec.	~	1,5
7.7	SALAVOLAD	193	34	~	0	<b>3</b> 0
49	OI ac 1	23	$\sim$	α) •	vo	<b>∽</b>
	Totals	3,196,520	973,678	737,225	55,331	2237

\*\* as of 1931 in PRASA files

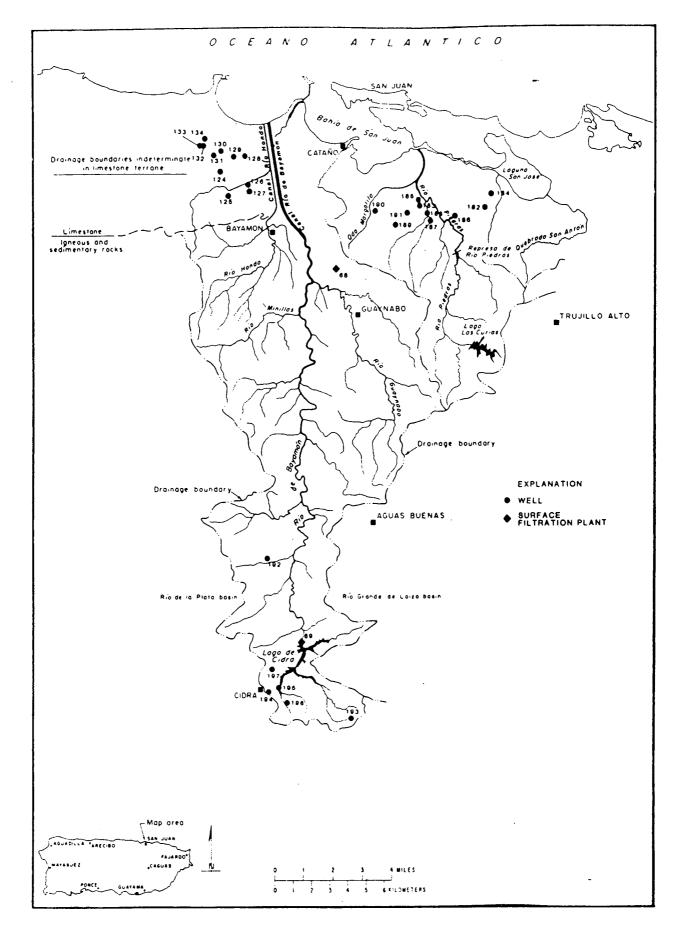
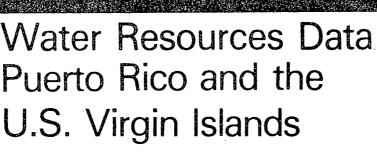


Figure 8.--Río de Bayamón and Río Piedras basins.





Water Year 1990



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT PR-90-1 Prepared in cooperation with the Commonwealth of Puerto Rico, the Government of the U.S. Virgin Islands, and other agencies

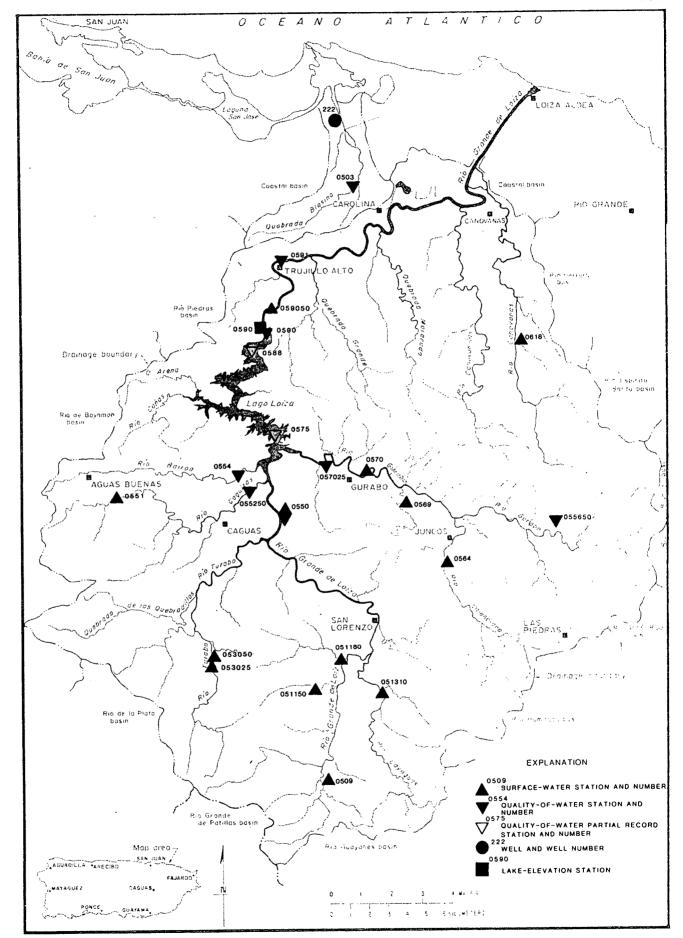


Figure 19.--Río Grande de Loíza basin.

#### RIO GRANDE DE LOIZA BASIN

## 50050300 QUEBRADA BLASINA NEAR CAROLINA, PR

#### WATER-QUALITY RECORDS

LOCATION.--Lat 18°23'27", long 65°58'28", at bridge on Highway 3, 1.4 mi (2.3 km) south of Valle Arriba Heights housing area, and 1.2 mi (1.9 km) west-southwest of Carolina plaza.

DRAINAGE AREA.--2.96 mi² (7.67 km²).

PERIOD OF RECORD .-- Water years 1973 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

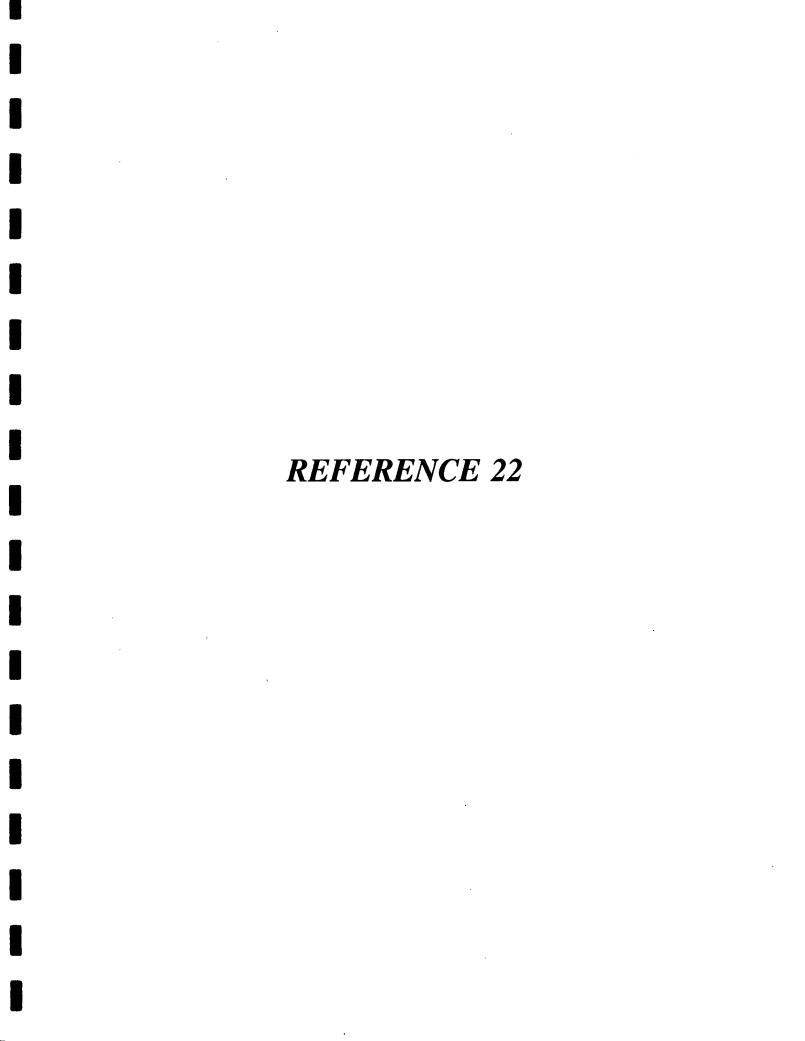
		WATE	R-QUALITY	DATA, WA	TER YEA	R OCTOBE	1989 TC	SEPTEMBER	( 1990		
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER ATURE WATER (DEG C	BID ITY	DIS	S- CENT	DEMAND CHEM- CHEM- CHIGH CHIGH CHIGH	, FORM, FECAL, 0.7	KF AGAR (COLS. PER
ОСТ 1989 19	1110	12	417	7.50	26.	5 20	5	.4	66 4	5 K7100	K14000
DEC 11	1055	12	440	7.50	25.	0 38	4	. 4	52 4	6 K1700	33000
PEB 1990 05	1105	7.5	478	7.40	22.	5 1.	5 4	. 8	54 1	.5 22000	0 K160000
APR 06	1105	13	446	7.60	26.	0 7.	0 6	. 4	77 3	3 21000	0 1800
JUN 04	1005	4.3	446	7.10	26.	5 4.	6 4	. 5	55 2	9 2400	0 2700
AUG 06	1050	6.2	422	7.80	27.	0 21	5	. 5	68 1	10 2000	0 1500
DATE	HARD- NESS TOTAL (MG/L AS CACO3)	HARD- NESS NONCARE WH WAT TOT FLD MG/L AS CACO3	DIS- SOLVED	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM DIS- SOLVEI (MG/I AS NA	SORE TIC RATI	- SI - DI ON SOL	UM, WAT W S- TOT F VED FIBL /L MG/L	Y H BT SULFII D TOTAI AS (MG/I	L SOLVE L (MG/L	DIS- D SOLVED (MG/L
OCT 1989 19	140	0	43	8.4	23	(	. 8 4	.1 1	.40 <0	.5 26	24
DEC 11								- 1	.60		
FEB 1990 05								- 2	.00		
APR 06	16	0 0	46	10	27	•	0.9 3	1.0	L60 <0	.5 20	36
JUN 04						-		1	180		
AUG 06	14	0 4	36	11	27		1 3	3.6	L40	24	27
DEC DEC PRE APP ( JUL)	DATE 1989 9 11 3 1990 55 8 66	RIDB, DIS- SOLVED (MG/L AS F) 0.10	ILICA, SUDIS- CO SOLVED TU (MG/L AS SIO2) (  21 25	NSTI- ENTS, S DIS- OLVED MG/L) 234	DLIDS, DIS, DIS, DIS, DIS, TONS PER DAY) 7.88	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) 43 69 19 32	NITROGEN, NITRATE TOTAL (MG/L AS N) 0.77 0.71 1.26 1.08 0.83	NITRO- GEN, NITRITE TOTAL (MG/L AS N) 0.13 0.09 0.24 0.12 0.17	NITRO- GEN. NO2+NO3 TOTAL (MG/L AS N) 0.90 0.80 1.5 1.2 1.0	NITRO- GEN, AMHONIA ( TOTAL (MG/L AS N) 0.69 0.20 1.2 0.23 0.61	NITRO- GEN. DRGANIC TOTAL (MG/L AS N)  0.91 1.7 0.90 0.87 0.99
(	06	0.20	30	240	4.10	10	0.91	0.09	1.00	V.22	
K :	non-ideal	count				•					

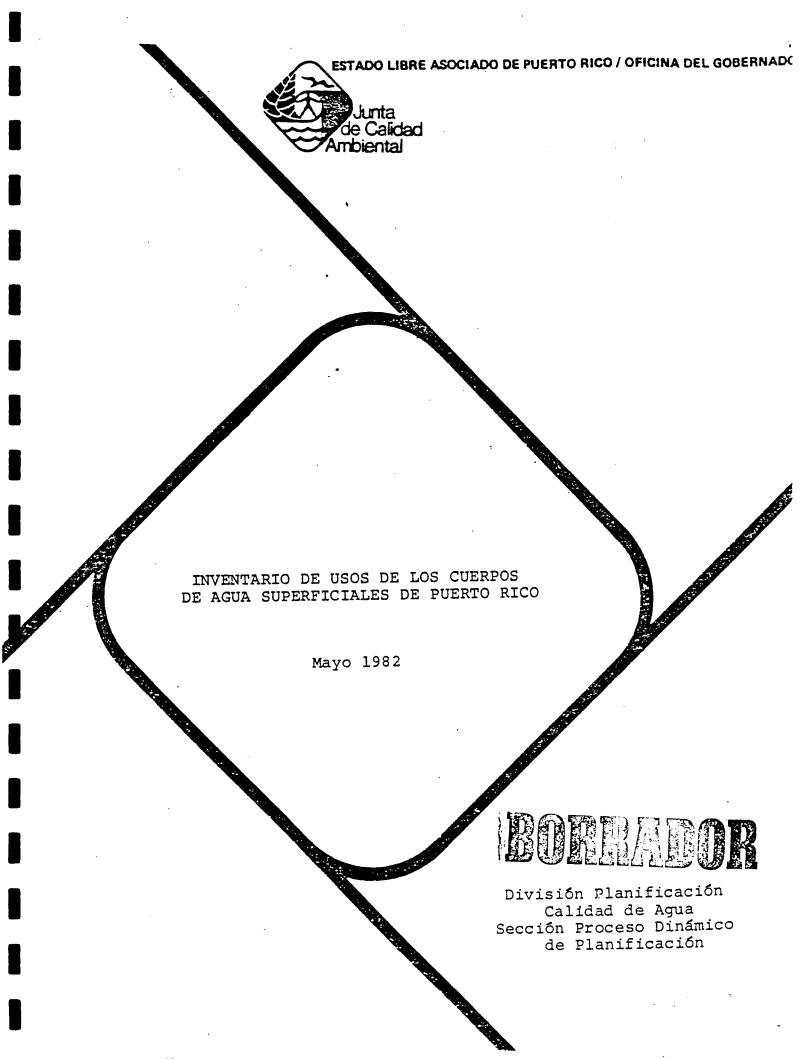
K = non-ideal count

RIO GRANDE DE LOIZA BASIN

50050300 QUEBRADA BLASINA NEAR CAROLINA, PR--Continued
WATER-QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L	NITRO- GEN, TOTAL (MG/L	NITRO- GEN, TOTAL (MG/L	PHOS- PHORUS TOTAL (MG/L	ARSENIC TOTAL (UG/L	BARIUM, TOTAL RECOV- BRABLE (UG/L	BORON, TOTAL RECOV- BRABLB (UG/L AS B)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD)	CHRO- MIUM, TOTAL RECOV- BRABLE (UG/L AS CR)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU)
	AS N)	AS N)	AS NO3)	AS P)	AS AS)	AS BA)	KS D)	NO CZ7		
OCT 1989 19	1.6	2.5	11	0.40	<1	<100	<10	<1	2	<10
DEC 11	1.9	2.7	12	0.74						
PEB 1990 05	2.1	3.6	16	0.59						
APR 06	1.1	2.3	\ 10	0.53	2	<100	20	1	2	10
JUN 04	1.6	2.6	12	0.50						
AUG 06	1.2	2.2	9.7	0.45						
DATE	IRON, TOTAL RECOV- ERABLE (UG/L AS PE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	SELE- NIUM, TOTAL (UG/L AS SE)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN)	CYANIDE TOTAL (MG/L AS CN)	PHENOLS TOTAL (UG/L)	METHY- LENE BLUE ACTIVE SUB- STANCE (MG/L)
ОСТ 1989 19	2000	5	350	<0.10	<1	<1	10	<0.010	<1	0.05
DBC										
11 PBB 1990 05										
05 APR 06	1400	9	520	<0.10	<1	<1	20	<0.010	2	0.12
JUN 04										
AUG										





#### QUEBRADA BLASINA

Nace la Quebrada Blasina en el Barrio Cuevas del Municipio de Trujillo Alto. La quebrada y sus tributarios fluyen a través de los municipios de Carolina y Trujillo Alto.

La Quebrada Blasina tiene una longitud aproximada de 12.38 kilómetros desde su nacimiento hasta su desembocadura en el Océano Atlántico.

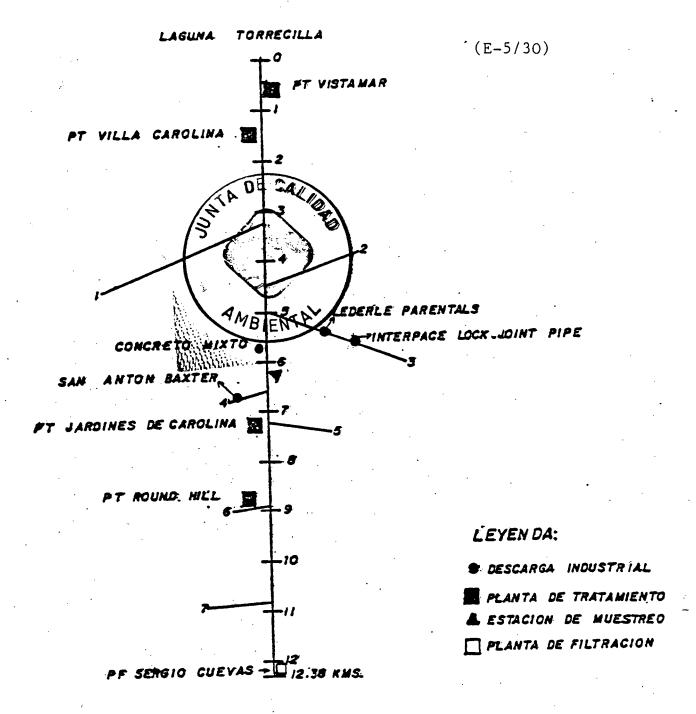
Recibe las descargas de las siguientes Plantas de Tratamiento de Aguas Negras: Vistamar, Villa Carolina, Jardines de Carolina y Round Hill. Recibe la descarga de la Planta de Filtración Sergio Cuevas y las siguientes descargas industriales: Lederle Parentals, Interpace Lock Joint Pipe, Concreto Mixto y San Anton Baxters.

En la quebrada hay una estación de monitoría de aguas superficiales.

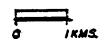
TABLA 5 CLASIFICACION POR SEGMENTOS DR

CLEBRADA BIASINA

USOS POTENCIALES	or or other control of the control o				· .
OBSERVACIONES	Aqui se encuentra parte del complejo vacia-Talega-Torrecilla Piñones. Hay varias especies de aves, que anidan en esta area entre las cuales se encuentra el pelícano marrón, especie protegida por agencias federales	· ·			
TRIBUTARIOS EN LA CLASIFICACION					
CLASIPICACION	Area Ecologicamente Sensitiva	Area de Recarga	Segmento alh clasificar		,
SEGMENTO	1. Desde la desembocadura de la quebrada hasta 1.6 kilómetros aguas arriba en los lintes de los barrios Sabana Abajo y loyo Mulas de los municípios de Carolina y Loíza respectivamente.	2. Itesde la desembocadura de la quebrada hasta 9.0 kilómetros aguas arriba, Barrio Cuevas Municipio de Trujillo Alto.	1. Desde el Kilómetros 9.0 hasta el nacimiento de la quebrada en el Barrío Cuevas del Municipio de Trujillo Alto		



## QUEBRADA BLASINA



## COMMONWEALTH OF PUERTO RICO/OFFICE OF THE GOVERNOR

ENVIRONMENTAL QUALITY BOARD



GOALS AND PROGRESS OF STATEWIDE
WATER QUALITY MANAGEMENT PLANNING
PUERTO RICO 1988-1989

MAY 1990 REVISED EDITION

## WATER QUALITY CLASSIFICATIONS & LOCATION OF MONITORING STATIONS ALONG MARTIN PEÑA SYSTEM

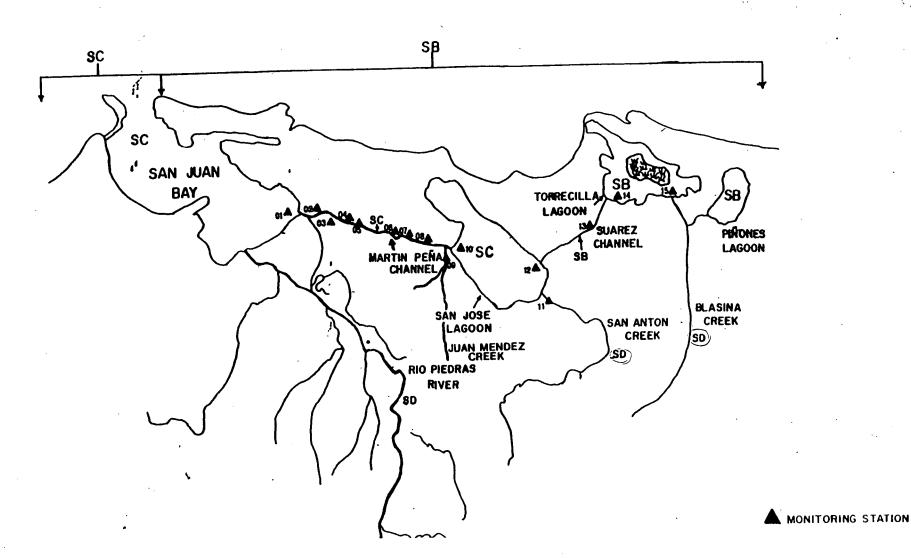


FIGURE 111.4.1

#### D. Critical Wetland Areas:

Twelve (12) critical mangrove swamp areas were identified along the coast of Puerto Rico, including Vieques and Culebra islands. These are:

## 1. Martín Peña Channel, San Juan

This area is located east of the San Juan Bay, delimited by the San Juan Central Park and the De Diego Highway by the north, and bordered by the Puerto Nuevo River along the south.

It is constituted by the four mangrove tree species found in Puerto Rico. It serves as a habitat and sanctuary to different bird species.

## 2. Piñones-Torrecilla Baja - Vacía Talega. Loíza:

This area is located at the north of Puerto Rico, delimited by the Río Grande de Loíza River on the west, and by the Isla Grande Beach Resort on the east.

Being the largest mangrove swamp on the island, it is formed by the four mangrove tree species. It provides an excellent nesting area for endangered bird species.

## 3. Río Espíritu Santo - Las Picúas, Río Grande:

This mangrove area is located in the Río Grande Municipality in the northeast of Puerto Rico. It is delimited by the Atlantic Ocean on the north, the Mameyes River on the east, Road #187 on the west, and by Barrio Zarzal of Río Grande on the south.

It is constituted by the four mangrove tree species, provides protection to submarine grass meadowlands (Thalassia) and to coral reefs near the meadowlands. It helps to minimize sedimentation, allowing coral growth. It has been designated as a critical wildlife habitat (Cardona & Rivera, 1988).

#### 4. Antón Ruíz River, Humacao:

This area is located on the east of Puerto Rico, to the northeast of Punta Santiago in the municipality of Humacao. It is mainly formed by the red and white mangrove trees, and is part of the Humacao Forest, which was designated a National Reserve in 1986. It has been considered a wildlife sanctuary since 1984.

## 5. <u>Puerto Jobos-Punta Pazuelo-Caribe & Mar Negro Keys. Salinas Guayama</u>

This area is located on the southern region of Puerto Rico, between the Salinas and Guayama municipalities along the coast, south of the Aguirre Electric Plant.

#### APPENDIX 2

# USE CLASSIFICATION INCLUDED IN THE CURRENT WATER QUALITY STANDARDS REGULATIONS

### Class SA

Coastal waters whose existing characteristics should not be altered in order to preserve the existing natural phenomena.

### Class SB

Coastal waters intended for uses where the human body may come in direct contact with the water (such as complete body submergence); and for use in propagation and preservation of desirable species.

### Class SC

Coastal waters for uses where the human body may come in indirect contact with the water (such as fishing, boating, etc.); and for use in propagation and maintenance of desirable species.

### Class SD

Surface waters intended for use as a raw water source for public water supply, and propagation and preservation of desirable species. These waters cannot be safely used for primary and secondary contact recreation, unless they comply with Section 2.2.4.B.10.

## CATEGORIES AND SUBCATEGORIES OF NONPOINT SOURCES AFFECTING THE WATERBODIES

### Watershed and Waterbody ID's

PRNS 0001 North Coast (M/E)

PRES 0002 East Coast (M/E)

PRSS 0003 South Coast (M/E)

PRWS 0004 West Coast (M/E)

PREN 0008 Laguna San José (M)

PREN 0009 Laguna Torrecilla (E)

### Categories and Subcategories

Urban runoff
Land disposal
—wastewater
Other
—natural

Urban runoff
Land disposal
—wastewater
Other
—natural
—recreational activities
—spills
Source unknown

Urban Runoff
Land Disposal
-wastewater
-landfills
Other
-natural
-recreational activities
Source unknown

Urban Runoff
Land disposal
-wastewater
Other
-recreational activities
-natural

Urban Runoff
-combined sewers
Other
-in place contaminants
Source unknown

Urban Runoff Other —in place contaminants Source unknown

### Waterbody ID's

PREN 0010 Laguna Piñones (E)

PRSN 0017 Laguna Tiburones (E)

PRSN 0024 Laguna Cartagena

Quebrada de los Cedros PRNC 0026 Quebrada de los Cedros (E)

Quebrada del Toro PRNC 0027 Quebrada del Toro (E)

R1o Guajataca PRNR 0029 R1o Guajataca (E/M)

PRNL 0030 Lago Guajataca (M)

PRNR 0031 R1o Guajataca (E)

R1o Guajataca PRNR 0032 R1o Guajataca (E/M)

Quebrada Bellaca PRNE 0033 Quebrada Bellaca (E)

### Categories and Subcategories

Urban runoff Other —in place contaminants Source unknown

Land disposal
-landfills
Other
-in place contaminants

Agriculture
Land disposal
—wastewater
Other
—in place contaminants
Source unknown

Other -Natural

Other -Natural

Land disposal
-wastewater
-landfills
Agriculture
-animal holding/management
areas

Agriculture
-animal holding/management
areas
Land disposal
-wastewater

Agriculture
-animal holding/management
areas

Agriculture
-animal holding/management
areas
Urban runoff

Other -Natural

### Waterbody ID's

Quebrada Juan Méndez PREC 0092 Quebrada Juan Méndez (M)

Quebrada San Antón PREC 0093 Quebrada San Antón (M)

Quebrada Blasina PREC 0094
Quebrada Blasina (M)

Río Grande de Loiza PREE 0095 Río Grande de Loiza (E)

PREK 0096 Caño Gallardo (E)

PREK 0097 Caño Zequeira (E)

PREK 0098 Canal Machicote (E)

PREK 0099 Caño Norberto (E)

PREK 0100 Caño Carrasco (E)

PRER 0101 Río Canóvanas (E)

### Categories and Subcategories

Urban runoff Land disposai -wastewater

Urban runoff Land disposal -wastewater

Urban runoff Land disposal -wastewater Other -Natural

Urban runoff
Agriculture
-non irrigated crop production
-animal holding/management areas
Land disposal
-wastewater

Other
-natural
Land disposal
-wastewater
Agriculture
-animal holding/managemente areas

Other -natural

Other -natural

Other -natural

Other -natural

Agriculture
—non irrigated crop production
—animal holding/management areas
Urban runoff
Land disposal
—wastewater

REFERENCE 24

# CRITICAL COASTAL WILDLIFE AREAS OF PUERTO RICO

By Julio E. Cardona and Manuel Rivera



Commonwealth of Puerto Rico
Department of Natural Resources
Puerto Rico Coastal Zone Management Program
Scientific Research Area
San Juan, Puerto Rico

September 1988

### CRITICAL COASTAL WILDLIFE AREAS

1- Torrecilla-Piñones, Vacía Talega Complex (Loiza-Carolina) M-1

This site is located east of the metropolitan area of San Juan. More than 10,000 acres in area, its vegetation is dominated by mangrove forests, but other plant communities occur, such as littoral woodland, freshwater swamp and marshes, and coconut plantations. The Piñones State Forest portion of this large and complex area was designated a Natural Reserve in 1979. Several technical documents have been prepared for this area. Information on water quality is found in Rodriguez (1981), an environmental evaluation was prepared by Palacios (1981). Details on the flora are contained in Del Llano et al. (1980). The avifauna was summarized by Perez and Ferrer (1980).

The Forest supports a diverse fauna including birds, reptiles, fish, and crabs, among others. We found four species of fiddler crabs. Reptiles are represented by several lizard species and a considerable population of the native fresh water turtle. The area is popular among fishermen, which harvest a number of species both for commerce and sport.

At least 89 bird species have been recorded from the area (Ferez and Ferrer 1980). The large variety of species ocurring in the area was evident during the field evaluation of this area. It supports a large number of herons and egrets, a considerable population of the Brown Felican (FE), terns and gulls. The Great Egret was observed nesting at Carmelita island. We also observed one individual of the Yellow-shouldered Blackbird (FE) foraging along with a number of Greater Antillean Grackles and Shiny Cowbirds. One pair of Blackbirds was later found nesting in the Forest's recreational area next to the administrative offices. The West Indian Whistling Duck (CT) and Masked Duck (CT) have been reported from the area by hunters (Perez and Ferrer 1980).

A variety of migratory birds such as Waterthrushes, Kingfishers, Ospreys, and a variety of warblers are abundant during the winter months. During one of our trips to the area we observed one Double-crested Cormorant. This species is accidental in Puerto Rico.

The construction of a bridge over the Loiza River and the widening and paving of road 187 connecting Loiza and Piñones have greatly increased vehicular traffic movement through the area. A sand dune was rebuilt by the U.S. Army Corps of Engineers to mitigate beach erosion, which intermittently occurs in a few

areas near the coast. Most of this sand dune was destroyed by heavy seas in late 1987.

Reforestation of the sand dunes and the placement of short posts to keep out off-road vehicles are some of the activities and improvements made by DNR personnel in the State Forest area. There is great pressure for development of large tracts of privately owned lands, especially in the eastern end of the Forest and the Vacia Talega sector. This has been the subject of heated debate in the Commonwealth's Legislature and represents the greatest threat to the future of this magnificent Forest, the largest remaining mangrove forest of the Island.

The area is under great pressure because of the recreational demands of a population pool of nearly one million people, Juan metropolitan area. the San residents of recreational demand is concentrated along the coastal segment, especially in the beaches and remnant sand dunes. This demand clashes directly with the reproductive needs of endangered sea Turtle nest searches are conducted regularly during the turtles. breeding season by Forest personnel and volunteers. kept poaching and accidental nest destruction to a minimum. Leatherback (FE) sea turtle nests frequently in the area's sandy beaches. The Hawksbill sea turtle (FE) also nests in the area, although in smaller numbers.

Another major threat to the area, of more lasting and destructive consequences, is in the form of private enterprise. Upscale residential developments and hotels are being proposed for private sectors within the eastern portion of the proposed Natural Reserve of Torrecilla Alta. These projects have received the public support of the town's Mayor and a number of Loiza residents, who apparently believe the Natural Reserve is limiting that town's economic development.

A Management Plan for Boca de Cangrejos Special Planning Area is being prepared by private consultants to the Planning Board, and is due in the near future. Much of the wildlife's wellbeing within both the designated and proposed Natural Reserves will hinge upon the objectives and recommendations of this plan.

With the ongoing accelerated degradation of the Constitution Bridge mudflats, the role of the Torrecilla-Piñones complex for migrant and resident wading and shorebirds is magnified. It is a primary wildlife area.

### 2- Torrecilla Alta (Loiza-Carolina) M-1

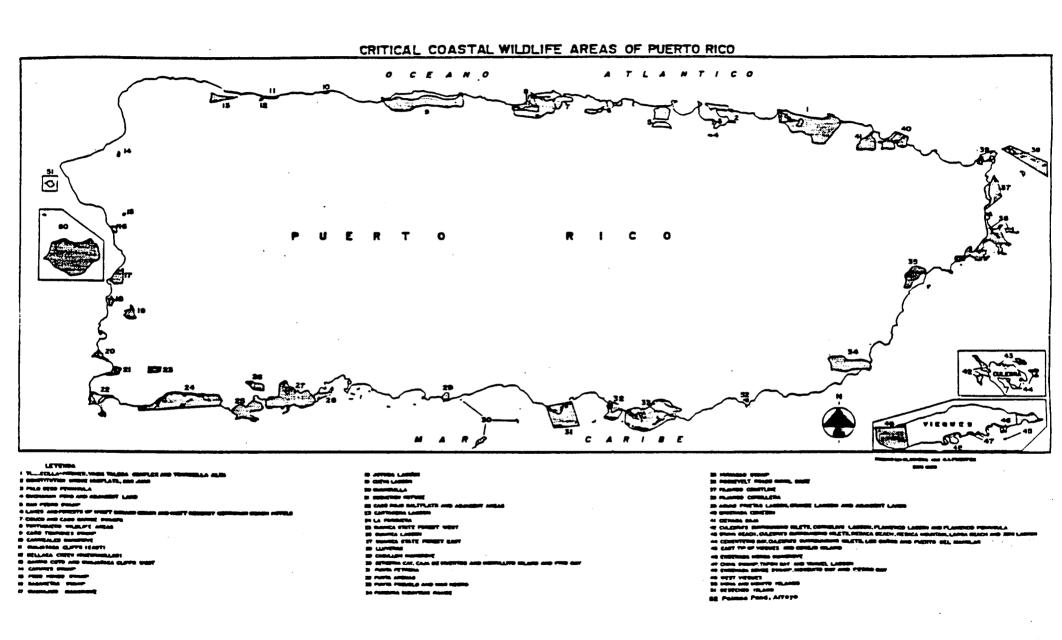
This large complex of freshwater swamps and marshes is located west of the Loiza River, near its mouth, in Loiza. It is adjacent to the Torrecilla-Piñones, Vacía Talega complex. The area is composed, to a large extent, of cattails and other characteristic plants of swamps and marshes. In addition, several Pterocarpus stands are located near the center and near the base of haystack hills to the south of the area. The eastern and western margins of this area are largely surrounded by abandoned agricultural lands and pastures for cattle grazing. A portion of the area is owned by the Commonwealth's Lands Administration and the rest is privately owned.

The Torrecilla Alta area was included in the 1979 Critical Wildlife Areas primarily because of its potential for development as a waterfowl hunting area with appropriate management. It was also believed to support numbers of the West Indian Whistling Duck (CT), as well as the rare White-crowned Pigeon, whose hunting is prohibited in Puerto Rico.

During field evaluation of the area we did not observe either species. However, nearby residents informed us that the Whistling Duck can sometimes be observed at dusk, crossing over to the east of the Loiza River. Two field trips at dusk were unproductive. Fortions of the area are popular pigeon and dove hunting grounds, and hunters claim White Crowned Figeons can be observed with fair regularity. This has not been confirmed in the field by DNR personnel working on a long term research project on columbid game species (Frank Rivera, Fers. Comm.). Great Blue Herons and American Bitterns were observed in the area in the early 1980's (Barbara Cintrón, Fers. Comm.).

Some degree of encroachment is evident along the southern limit of the area. There, an increasing number of houses have been built on the southern face of the haystack hills.

Recommendations in the 1979 document regarding the blasting of potholes to promote and diversify waterfowl use of the area are still applicable and desirable. Portions of the area of little use for agriculture could be leased or otherwise obtained from the Lands Authority for that purpose. Designation of Torrecilla Alta as a Natural Reserve is highly desirable for its adequate management and protection. Torrecilla alta is a primary wildlife area.



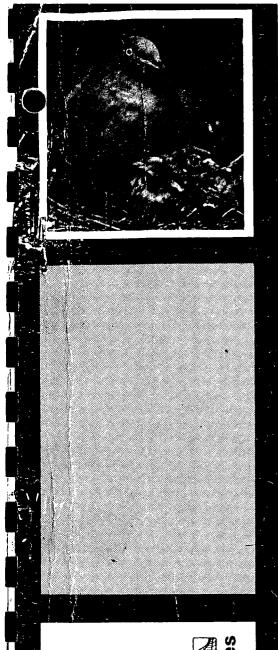
### SYMBOLS UTILIZED ON MAPS

Legend:						
Water						
Mangrove	<b>ेट</b>	3.70.5				
Wetland						
Dike				·		
Industrial Ar	ea					
Urban or Re	sidential	Area	0000	******		
Name and Location of Critical Fauna in the Area 🛕 📗 🕕						
Area Included	l as Critica	Wildlife	B Habita	• •	]	
Sand dunes	TARACHO SONO					

MAP

87

REFERENCE 25



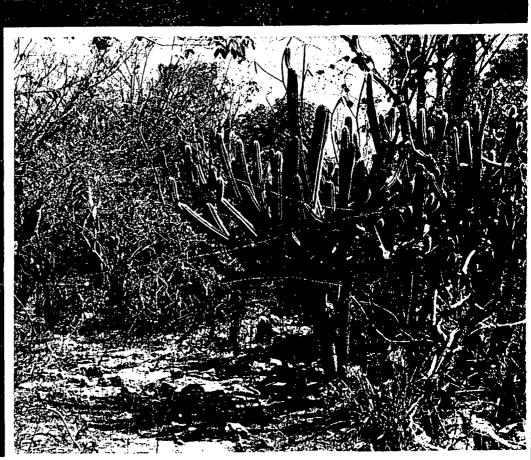
# Critical Wildlife Areas of Puerto Rico

Resource Planning Area

Coastal Zone And Wildlife Planning Division



Departamento de Recursos Naturales



### CRITICAL WILDLIFE HABITATS

### 1. <u>Torrecilla-Piñones, Vacía Talega Complex</u> - (Carolina)

Torrecilla Lagoon has several cul-de-sac inlets and shallow, protected channels that serve as feeding areas for a substantial variety of herons and other waterbirds. The cul-de-sacs would probably become significant nesting area for a number of heron species if they were better protected. Among the species that are dependent on the shallow channels and inlets are the Great Blue Heron, Great Egret, Snowy Egret, Louisiana Heron, Little Blue Heron, Osprey, Brown Pelican (Protected-federal ESA)., Common Gallinule, and Belted Kingfisher. In the more open portions of the lagoon Magnificent Frigatebirds and various gulls and terns are common.

Unlike Torrecilla Lagoon, Piñones is used very little as a feeding area for waterbirds, possibly because of its depth.

However, small Carmelita island gives the lagoon an important wildlife resource. Carmelita, the only island in Piñones lagoon and the most remote in this mangrove system, has the only remaining heron roost and rookery in this State Forest. The island has a year round roosting colony of Cattle Egrets. The birds of this species in the colony number in the thousands and they nest on

Carmelita as well as roost. The species goes to feed in pastures and is common in this habitat throughout Puerto Rico.

Cattle Egrets feed on insects flushed out of the grass by cows.

They are therefore very beneficial.

Along with the Cattle Egrets Carmelita holds the largest population of Snowy Egrets known in Puerto Rico. This species is threatened in Puerto Rico as a result of the elimination of its nesting areas and feeding grounds. According to Mr. Clemente, the forest ranger, this bird once nested on Carmelita and on Punta Mosquitos in Torrecilla Lagoon and now no longer does. The bird continues to roost on Carmelita, as many as 300 birds having been observed landing there at dark. This is far and away the largest roost of this species ever reported in Puerto Rico. The Snowy Egret is one of the most beautiful of birds. was almost exterminated in the United States as well as in Puerto Rico around the turn of the twentieth century by plume hunters. The feathers of these egrets were used in the millinery trade. The species has been relatively rare in Puerto Rico ever since that time, though it has made a small comeback. It is now threatened by habitat destruction rather than by plume hunters. It is unfortunate that the status of this egret has gradually

worsened within the Torrecilla-Piñones mangrove complex.

While it once almost entirely relied on the mangrove ecosystem,

much of which is within Forest boundries, the bird now is

forced to nest, and to a large extent feed, outside the State Forest.

No less than one hundred Louisiana Herons have been observed to roost on Carmelita. This is as large a roost as has ever been recorded of this species in Puerto Rico. The Louisiana Heron, as did the Snowy Egret, also suffered at the hands of plume hunters and has only recently become fairly common again in Puerto Rico.

Other birds that roost on Carmelita include numbers of Little Blue Heron, Great Egrets, Great Blue Herons and Brown Pelicans.

Of the latter as many as 125 have been recorded roosting there in one evening. From these data it appears that Carmelita may well be the most significant single heron roost in Puerto Rico. It is unfortunate that these birds are not sustained entirely within the State Forest.

The Torrecilla-Piñones area should be developed to serve a number of wildlife related uses. Portions of the area should be more completely restricted to human use than at present so they may serve as small sanctuaries to promote breeding of herons and

pigeons. Other portions of the complex should be further opened to the public for recreation and education to take advantage of the locality's proximity to the metropolitan area. This could primarily be done by constructing interpretive trails and promoting boat tours.

Other specific recommendations are included elsewhere (see Raffaele, 1974).

The Torrecilla and Piñones lagoons are primary wildlife areas.

### . <u>Torrecilla Alta</u> - (Carolina)

The fresh water swamp at Torrecilla Alta (southeast of Torrecilla & Piñones lagoons) is a contiguous part of the Torrecilla-Piñones, Vacía Talega complex (see map). Though practically dominated by cattails, it possesses scattered <a href="Pterocarpus">Pterocarpus</a> clumps which reputedly support the endangered West Indian Tree Duck in significant numbers and the adjacent hills reportedly are major feeding areas for the threatened White-crowned Pigeon. Various other rare forms, and waterfowl in some numbers have also been reported from the area.

The fresh water swamp at Torrecilla Alta should be zoned against development and managed to foster hunting. The blasting of potholes in the swamp would be inexpensive and should substantially

increase the numbers of waterfowl in the area. The construction of impoundments in this zone would be even more beneficial, but would prove substantially more expensive. The adjacent limestone hills should be protected from further destruction from developments so that they might continue to serve as an important locality for pigeon and dove hunting.

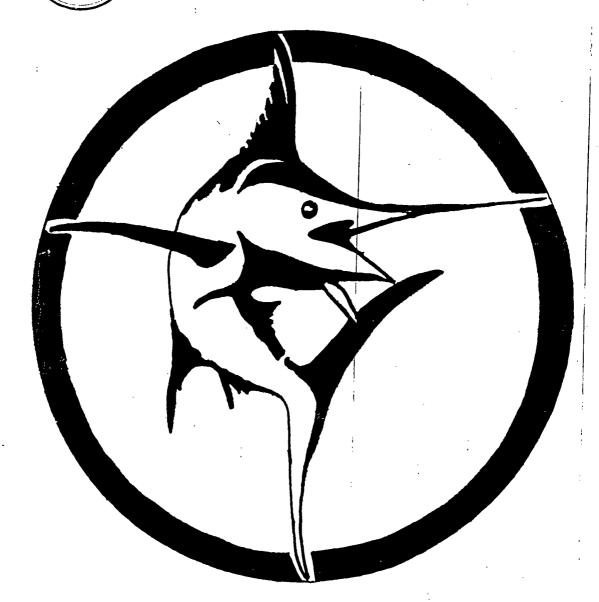
Torrecilla Alta is probably a prime wildlife area.

REFERENCE 26

Final Report Project 8-5-5. Marine Sport Fisheries Greel Survey



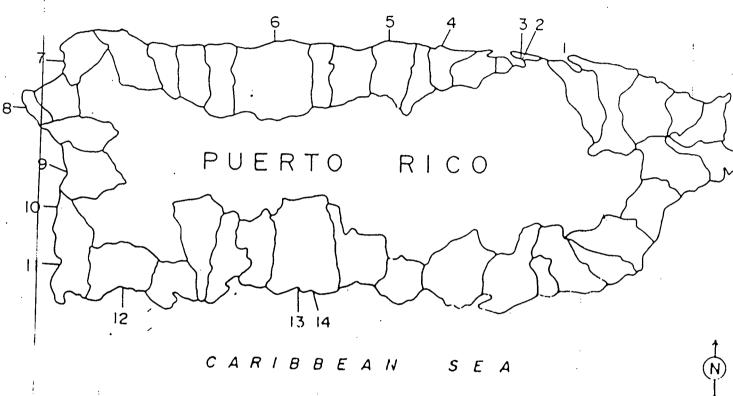
Jose M. Berrios Emilia I. Medina Howard Ferrer Israel Diaz



Department of Natural Resources Scientific Research Area Marine Resources Section

(April 1989)

### ATLANTIC OCEAN



- I. Cangrejos Yatch Club
- 2. San Juan Yatch Club
- 3. San Juan Fishing Center and Marina
- 4. Dorado Sport Fishing Association
- 5. Vega Baja Yatch Club
- 6. Arecibo Yatch Club
- 7. Aguadilla Yatch Club

- 8. Rincon Yatch Club
- 9. Mayaguez: Yatch Club
- 10. Western Sport Fishing Club
- II. Boqueron Yatch Club
- 12. La Parguera Yatch Club
- 13. Ponce Sport Fishing Club
- 14. Ponce Yatch Club

areas reach the fishing grounds in much less time than those leaving from the other coasts. Table 1 shows that anglers leaving from the north and northwestern coasts arrive at the 100 fathom depth in an average time of 7 minutes travelling at an average speed of 15 knots. On the other hand, those leaving from the western and southern coasts it take from 20 to 60 minutes to reach the 100 fathom depth contour at the same average speed.

### B. Shorefishing

For the purpose of shorefishing sampling the Island was divided into six major areas based on the preliminary data (Figure 5). Areas with poor accessibility or with minimal fishing effort were not included.

#### Area I

Area I spans from Rio Grande de Loiza in Loiza Aldea to Condado Bridge in San Juan. Topography is predominantly level along the whole coastal area. Two of the major estuarine and lagoonal systems of the Island are located between these points; the Rio Grande de Loiza and the Torrecillas and Pinones Lagoons. Both are important nursery areas for sportfish species as well as other aquatic life. From Loiza to Boca de Cangrejos there are many miles of sandy beaches. Although most of the shoreline is accessible

through route 187 which runs along residual sand dunes, shorefishing is very much restricted by the heavy vave action occurring most of the time. From Boca de Cangrejos to Condado accesses to the coast have been severely limited by the construction of buildings almost over the entire shoreline. The most popular fishing spots along this area are the mouth of the Rio Grande de Loiza, and the Boca de Cangrejos and Condado's Bridges (Plates 12 thru 14).

### Area II

The second area studied goes from Dos Hermanos Bridge to Dorado. A variety of ecosystems types such as bays, estuaries, rocky shore, sandy beaches and islets occur between these limits.

The San Juan Bay, although inhabited by a large number of sportfish species, loes not have adequate areas for shorefishing. This is mainly due to the fact that it is the major port of the Island and is surrounded by many buildings, private and government piers and marinas and other constructions which limit access to anglers.

From Isla de Cabras to Dorado the access to the shoreline is fairly good since road 165 runs parallel to the shore. The most popular fishing spots along this area are the Dos Hermanos Bridge, a small pier near the San Juan Gate, the Palo Seco Area (Plates 15), the Bridges over Rio



FIRM
FLOOD INSURANCE RATE MAP

COMMONWEALTH OF
PUERTO RICO

COMMUNITY-PANEL NUMBER
720000'0054'C

PANEL 54 OF 325
(SEE MAPINDEX FOR PANELS NOT PRINTED)
MAP REVISED:
DECEMBER 15, 1990

Federal Emergency Management Agency

### KEY TO MAP

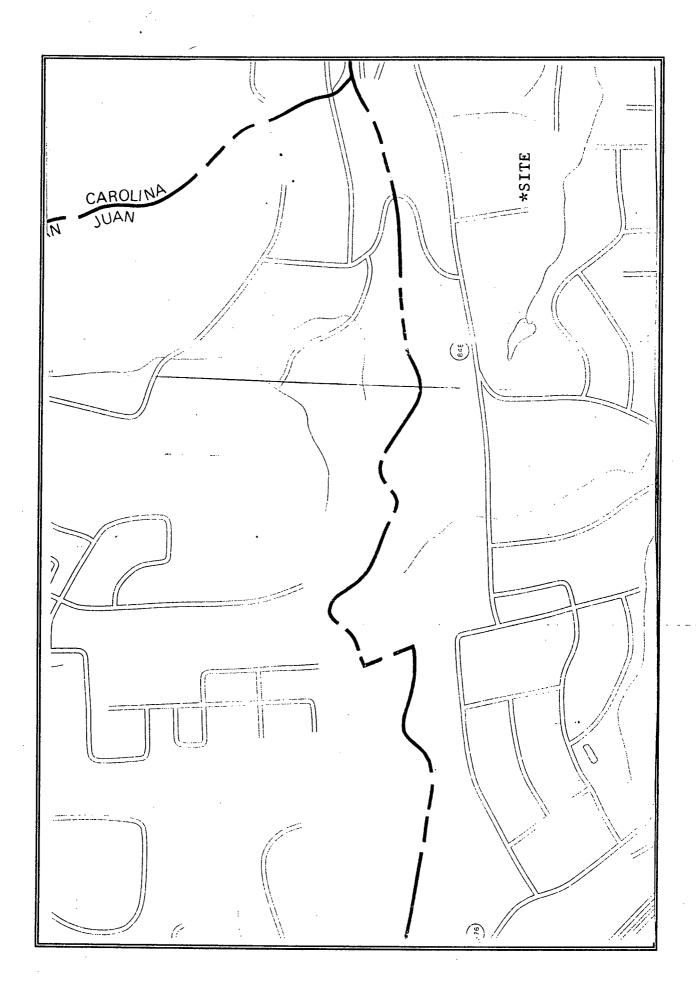
#### 500-Year Flood Boundary Areas of 100-year flood; base flood elevations and ZONE B flood hazard factors determined. 100-Year Flood Boundary Areas of 195 year flood to be protected by flood A99 Zone Designations motecilies system under construction; base flood elevations and flood hazard factors not determined. Areas between limits of the 100-year flood and 500year flood; or certain areas subject to 100-year flooding with average depths less than 0.3 meter or where 100-Year Flood Boundary ZONE B 500-Year Flood Boundary the contributing drainage area is less than 2.6 square kilometers, or areas protected by levees from the base flood. (Medium shading) Base Flood Elevation Line With Elevation In Meters\*? **√**c Areas of minimal flooding, (No studing) Areas of undertermined, but possible, flood hazards. Base Flood Elevation Line tilft-year coastal flood with velocity (wave-Where Unitorin Within Zone !: action); base flood elevations and flood hazard factors RM7<sub>×</sub> Elevation Reference Mark Niews of 160s, ear coastal flood with velocity (wave-V1-V30 \*\*Referenced to Mean Sea Level action); base floor elevations and flood hazard factors \*EXPLANATION OF ZONE DESIGNATIONS ZONE EXPLANATION Areas of 100-year flood; base flood elevations and flood basard factors not determined, ΑO Areas of 100-year smallow flooding where depths

are between 0.3 and 1.0 meter; average depths of inundation are shown but no flood hazard factors

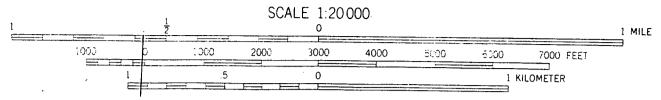
Areas of 100-year shallow flooding where depths are between 0.3 and 1.0 meter; base flood elevations are shown, but no flood hazard factors are deter-

AΗ

mined.



REFERENCE 28



CONTOUR INTERVAL 5 METERS
DOTTED LINES REPRESENT 1-METER CONTOURS
DATUM IS MEAN SEA LEVEL

DEP H CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 0.3 METER

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA, 22092
AND DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS, SAN JUAN, P. R. 00910
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLAS	_	
Primary highway, all weather.		
Secondary highway, all weather. hard surface	Unimproved r	bad, fair or dry
Insu	ılar Route	

AGUAS BUENAS, P. R.

N1815-W6600/7.5

1969

PHOTOREVISED 1982 DMA 13221NE-SERIES E835 SAN JUAN, P. R. N1822.5-<del>W66</del>00/7.5

1969

PHILL OREVISED 1981 DMA 1323 H SE-SERIES E835

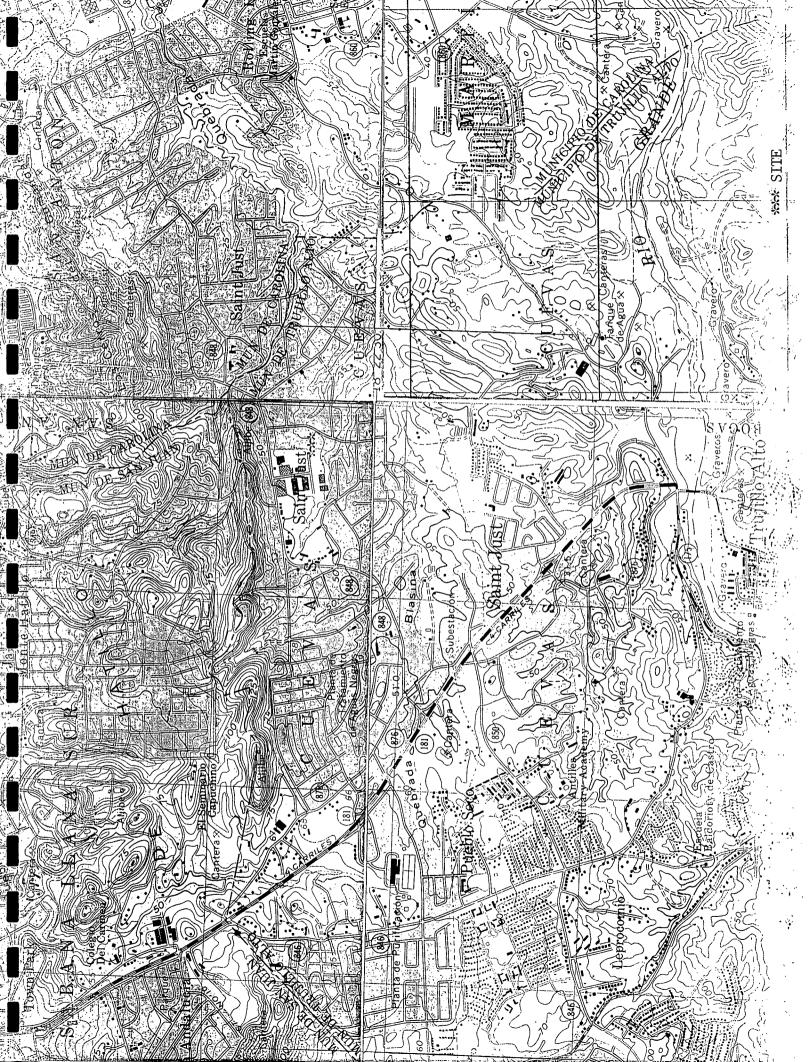
CAROLINA, P. R. N1822 5-W6552 5/7 5

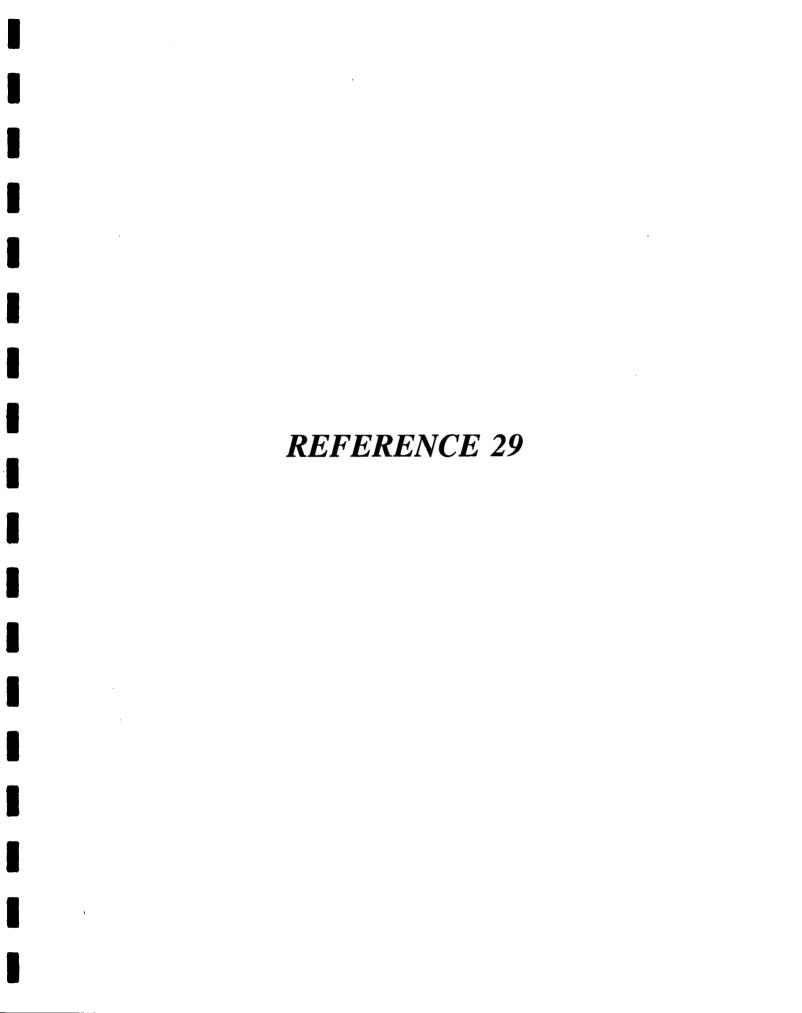
GURABO, P. R.

N1815-W6552.5/7.5

1969

PHOTORE //S87. 1982 DMA 1422 IV NW-SERIES E835



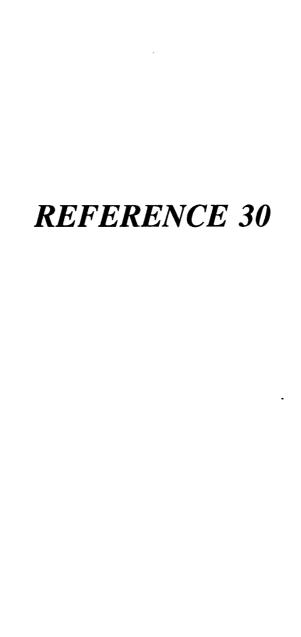


# PR ENVIRONMENTAL QUALITY BOARD SUPERFUND PA/SI PROGRAM

Ref. 29

TELECON NOTE

CONTROL NO: PRD 987379344	DATE: May 28, 1992	TIME: 1350					
DISTRIBUTION: B and B Woodtreating and Processing II							
BETWEEN: Mrs. Jenny Ríos	OF: Multiplastics, Inc.	PHONE: (809) 761-4010					
AND: Jorge L. Quiñones							
DISCUSSION: Employees in Multiplastics							
There are about 70 employees working in this company.							
·							



# PR ENVIRONMENTAL QUALITY BOARD Ref. 30 SUPERFUND PA/SI PROGRAM **TELECON NOTE** DATE: CONTROL NO: TIME: PRD 987379344 May 28, 1992 1359 DISTRIBUTION: B and B Woodtreating and Processing II OF: PHONE: BETWEEN: (809)Mrs. Milagros Montud Signal Caribe 755-4917 AND: Jorge L. Quiñones **DISCUSSION: Employees in Signal Caribe** There are about 203-240 employees working in this company.

REFERENCE 31

# Census of Population and Housing

PHC80-P-53

### **PUERTO RICO**

### **Preliminary Population and Housing Unit Counts**

This report is based on preliminary counts of population and housing units as compiled in the 1980 census district offices. The series consists of 56 reports—number 1 for the United States; numbers 2 through 52 for the States and the District of Columbia in alphabetical order rather than in order of publication; and numbers 53 through 56 for Puerto Rico, Guam, Virgin Islands, and American Samoa. Preliminary counts for the Northern Mariana Islands and the remainder of the Trust Territory of the Pacific Islands are not part of this series of reports. These counts will be made available in a separate press release issued for each area.

( December 19 )

As of April 1, 1980, the population of Puerto Rico was 3,187,570, according to a preliminary count of the returns of the 1980 census. This figure represents an increase of 475,537, or 17.5 percent, from the 2,712,033 inhabitants enumerated in the 1970 census.

The preliminary count of housing units in Puerto Rico as of April 1, 1980, was 990,172. This figure, which includes both occupied and vacant housing units, represents an increase of 276,459, or 38.7 percent, from the 713,713 units enumerated in the 1970 census.

This report presents preliminary 1980 census population and housing unit counts for the Commonwealth,

municipios, municipio subdivisions, zonas urbanas, and standard metropolitan statistical areas (SMSA's).

The 1970 data are presented only for Puerto Rico and its municipios. The boundaries used in the 1970 census did not represent the official boundaries of some of the barrios, ciudades, and pueblos.

These preliminary figures will be superseded by the final counts to be shown in Advance Reports; series PHC80-V, which will be issued within the next few months. The final counts are subject to further processing and review and may differ from the preliminary figures.

An outline of the publication and computer tape program for the 1980 Census of Population and Housing can be obtained free of charge from the Data User Services Division, Bureau of the Census, Washington, D.C. 20233.

Symbols used in tables. A dash "-" represents zero. Three dots "..." means not applicable, and "(NA)" means not available. The prefix "r" indicates that the count has been revised since publication of 1970 census reports.

Issued February 1981

### Table 1. Population and Housing Unit Counts for Puerto Rico by Municipios and Municipio Subdivisions: 1980 and 1970—Con.

Counts relate to areas as delineated at each census. Information on boundary changes will be shown in the PC80-1-A report for this area. For meaning of symbols,

		Counts relate t see texti	a areas as del	ineated at eac	ch census 1	Atornation on booldary changes will be specific	·		<del></del> ~	
Burne Die		Popula	tion	Housing units		Puerto Rico	Population		Housing units	
Puerto Rico Municipios		1980 (prelim		1980 (prelim		Municipios	1980 (prelim	1970	1980 (prelim	1970
Municipio Subdivisions		inary)	1970	inary)	1970	Municipio Subdivisions	inary)	1470	inary}	
Bayamon Municipio		195 965	156 192	56 114	39 566	Caroling Municipio Can	İ			
Bayamon pueblo		6 710		2 467 2 467		Hayo Mulas barria Con Carolina zona urbana (pt.)	30 713		8 29 I 5 59 2	• • • •
Ruena Visto barrio		10 245		2 910		Martin Gonzalez barria	19 412		5 592	
Bayamon zana urbana (pt.)		8 507 31 426		2 392 9 197		Sabana Abajo barrio	62 578		18 906 18 906	
Bayamon zona urbana (pl.)		31 426	· · i	9 197 462		Carolina zana urbana (pt )	. 7 326		2 300	· · ·
Dajaos barrio		1 596 2 630	:	196		Carolina zona urbana (pt.)			2 300 463	
Bayamon zona urbana (pt.)		756 512		236 144		Santa Cruz barrio	6 381	]	1 801	• • •
Guaraguao Arriba barrio		1		12 315		Carolina rona urbana (pt )	5 725	··· i	1 613	
Rata Tejas barrio	٠.	43 945 43 945	***	12 315		Catano Municipio	1 4 604	26 459	7 632 1 785	6 738
Juan Sanchez barrio		15 330 15 330		4 176 4 176			4 594		1 785 5 847	• • •
Bayaman zano urbana (pt.) Miniflas barrio		42 574		12 377 12 377		Palmas barro Calana zana urbana (pt.)	21 724		5 847	
Bayaman zona urbana (pt.) Nuevo barrio		47 574 2 234	1 1	708			40 927	38 432	12 308	9 39
Pajaros barrio		35 606 35 606		9 680 9 680		Beatriz barrio	. 1 212		333	
Bayamon zona urbana (pt.) Santa Olaya barrio		3 157		887	• • • • • • • • • • • • • • • • • • • •	Cayey pueblo	19 815		6 016	
Caba Rajo Municipio		33 909	26 060	12 608	8 272	Cedro barrio	306		101	
Bajura barrio		2 457		825 520		Cercadillo barrio	165		66	
				1 502		Culebras Baja barrio	277		110	
Caba Rojo pueblo		1 913		. 795 795		Farallon barrio	942		277	
Cabo Rojo zona urbano (pt.)		2 317		1 115		Jajome Alto barrio	. 548		163	
Llanos Costa barria		1 836		668 1 716		Jajome Bajo barrio	583		182	***
Mirodero barrio		8 805		3 041		Lapa barria	938		48 312	
Cabo Rojo zona urbana (pt.)		3 762		1 140		Moton Arriba barrio	625		178 711	
				1 816 832		Monte Llano barrio (ayey zona urbano (pt.)	1 147		268	
		3 217		1 130		Pasto Viejo barrio	324		178	
Cabo Rojo zona urbana (pt.)		714		212		Predon horrio	. 23		328	
		118 020 14 575	95 661	35 266 4 419	24 904	į.	. 972			3-7
Cagues zona urbana (pt.)		10 928		3 412		Rincon barrio	2 340		722	
Beatriz barria		3 568		1 067		Sumido barrio	426		133 1 756	and the
Coguos pueblo		28 745		9 331 9 331		Torto barrio	5 854		684	200 (15° 450 200 (15° 450)
Caguas zona urbana (pt.)		. 28 745 2 787		790		I Maria Sanasa	1 743		468	
Caguas zona urbano (pt.)		. 1940		544 6 990		Ceibo Municipio	14 781	10 312	4 592.	
Canabancita barria				5 964		le. u	3 008		1 042	
Ria Canas barrio		Į.		1 817		1 Ch. annullar bassin	2 709		827 38	
San Antonio barria		. i 648		512 633		Daquao barrio		• • • •	974	
San Salvador barrio Tomas de Castro barrio		2 341		4 164		Machas barrio	2 341.		778	7.0
Caguas zona urbana (pt.)		. 10 277		3 117		1	1 656		297	いい 有額
Turabo barrio				4 126		i	786 1 036		276 360	
Camuy Municipio		24 886	19 922	7 546	5 289	)		15 595	4 582	34.
Abra Handa barria		. 1 862		515 543			1 426		516	794
Camuy pueblo		. 1 488		543		Ciales zona urbana (pt.)	1 426		333	
Camuy Arriba barrio				320			1 901		519	
Cienagas barrio		1 050		321		and the second s			543	4.0
Membrillo barrio		1 707		466		Hato Viejo barrio	1 504		1 063	
Puente barrio		- 5 542 2 344		1 885		Cates zona urbano (pt.)	1 864		467 485	17.5
		1 309		378		Pesas tiarrio			1	100
4010-1000 44-110-11		. 2 926		811		Pazas bar io			355 270	
Santiago barrio Yeguado barrio		. 310		501					7 832	· 25
Zanja barria		2 449		704		Cidra Municipio	28 135 4 171		1 167	
Canavanas Municipio		31 934		9 346		(.dra zona urbana (pt.) Bayaman barria	1 942 6 486		1 679	
Canavanas barrio Canavanas zona urbana (pt.)		12 809		3 619		(idra zona urbana (pl.)	. 420		1	4.
Canavanas pueblo		3 068 3 068		985 985		Beatriz barrio Ceiba barrio	2 076		835	0
Canovanas zona urbana (pl.) Cubuy barrio		1 318		508		Cidra rona urbana (pt.)	749		1 440	
Hato Puerco barrio		4 866		1 437		Cidra puebla Cidra zona urbana (pt.)	1 661		568	· · · · · ·
Lomas barrio Tarrecillo Alta barrio		1 ເກາກ		436		Louis in know	. 1 135		1	
Carolina Municipio		165 207	107-643				614		194	
Barrazas barria		2 877 2 687		843 793		Rabanal barrio . Rincon barrio	2 270 2 216		623	i, •
Cacao barria Cangrejo Arriba barria		16 191		9 204		Rio Abajo barrio	772		218	
Carolina zona urbana (pt.) . Canavanillas barrio		. 16 191		9 204		Sulta barria	3 092	٠	776	
Caralina zona urbana (pt.)	-	3 513		1 019		Cidra zona urbana (pt.)	1 293			
Carolina pueblo (pt.)		1 642	,	563			1			11 11 11
Carruzas barrio		1 736		495		Coamo Municipia	30 752 10 225		3, 220	) - 建学家
Cedro barrio		1		9 915		Coamu zoria urbana (pt.) Coamu Arriba barrio	10 225		1 150	
Hovo Mulas barrio		36 392		1 4 412		. I Counta milita parria		• •		40.00

Tuble 1. Population and Housing Unit Counts for Puerto Rico by Municipios and Municipio Subdivisions: 1980 and 1970—Con.

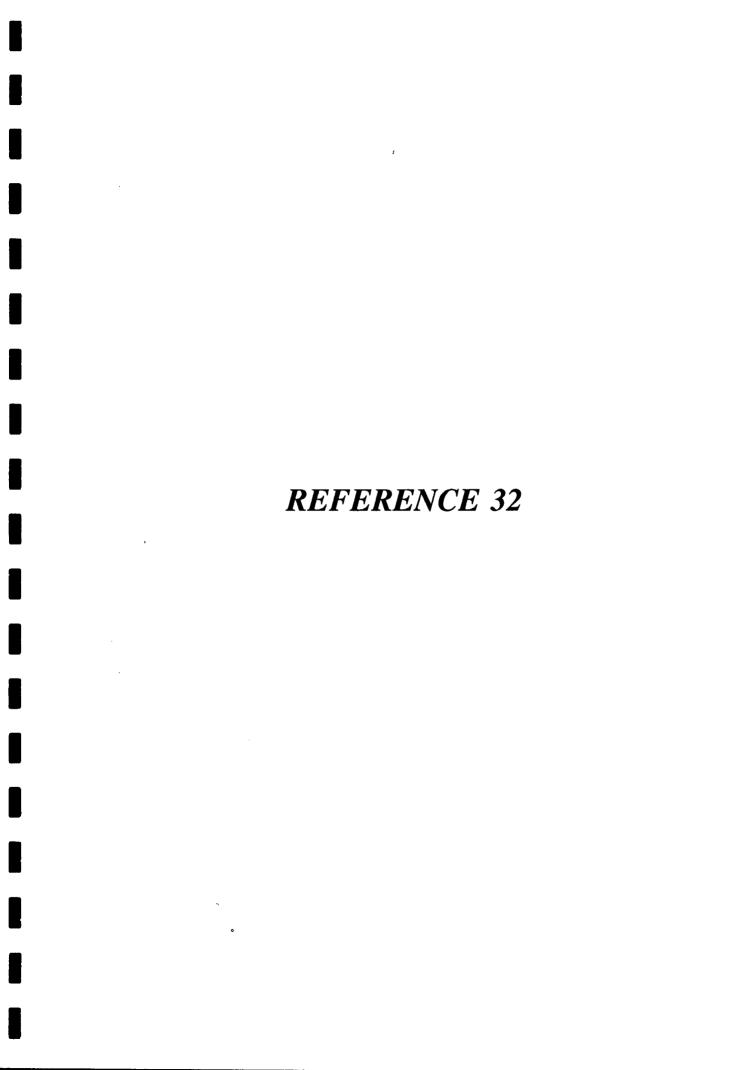
(Counts relate to areas as delineated at each census. Information on boundary changes will be shown in the PC80 1-A report for this area. For meaning of symbols, see text)

Puerto Rico	Popul	otion	Housing	units	Puerto Rico	Popuk	tion	Housing	units
Municipios	1980		1980		Municipios	1980		1980	
Municipio Subdivisions	(prelim	1970	(prelim inary)	1970	AA	(prelim inary)	1970	(prelim- inary)	1970
Penuelas Municipia Con					Rio Grande Municipio	34 326	22.022	10.071	4 030
Penuelas pueblo	7 767	İ	672		Cienaga Alta barrio	2 993	22 032	10 871 872	6 030
Penuelas' zona urbana (pt.)	2 267	ł	672		Cienuga Baja barrio	13 956		4 040	
Quebrada Ceiba barrio Penuelos zona urbano (pt.)	2 878 1 204		856 391		Rio Grande zona urbairo (pt.) Guzman Abaja barrio	8 057		7 335	
Rucio barrio .	978		240		Rio Grande zana urbano (pt.)	3 540 50		1 206	
Santo Domingo barrio	3 655	i	960		Guzman Arriba barrio	242	111	87	
Tallaboa Alta barria . Tallaboa Poniente barria .	! 620 699		43 <i>7</i> 215		Herreras barrio	917		265	
Tallobou Saliente barria	674	·	186		Ria Grande zona urbuna (pt.) Jimenez barria	878 2 161		251 864	
I		· 1			Mumeyes II barrio	2 277		990	
Ponce Municipio Anon barrio	188 219 2 13 <b>2</b>	158 981	54 879	39 587			!		
Bucana barrio	4 157		511 1 187		Rio Grande pueblo Rio Grande zono urbuno (pt.)	3 083 3 083		971 971	
Pance zona urbano (pt.)	4 157		1 187		Zarzal barria	5 157	:::	1 581	
Conas barrio Ponce zona urbana (p1 )	21 884 19 405	i	5 913 5 082				}		
Canas Urbano barrio	77 225		6 714		Sabana Grande Municipio Machuchal barrio	20 164 4 599	16 343	6 720 1 430	4 652
Ponce zona urbana (pt.)	22 225		6 714		Sabuna Grande zona urbana (pt.)	585		1 430	
Capitanejo barrio . Cerrillos barrio	1 400 2 445		403		Rayo barrio	2 232		738	
Ponce zona urbana (pt.)	1 417		641 362		Sabana Grande zona urbana (pt.) Rincan barrio	143		57	
·				• • •	Sabana Grande zona urbana (pt.)	2 936 1 450		915 406	
Coto Laurel barrio	5 084		1 375		Sabana Grande pueblo	2 233		919	
Ponce zona urbana (pt.) Cuarto barrio	130 3 267		42 1 322		Sabana Grande zona urbana (pt.)	2 233		919	`
Pance zona urbana (pt.)	3 767		1 322		Santana barria Sabana Grande zona urbana (pt.)	4 662 2 957		1 572 992	• • • •
Guaraguao barrio.	1 286		379						
Machuelo Abajo barrio	15 605	· · · j	4 315		Susun barrio	2 290		755	
Machuelo Arriba barrio	15 605 11 691		4 315 3 001	• • •	Taboniuco barrio Torre barrio	271 941		95	
Pance zona urbano (pt )	9 686		2 464		Torre burrier .	741		296	• • •
Magueyes barrio	6 113		F 607		Salinas Municipio	26 494	21 837	8 283	6 001
Ponce zona urbana (pt.)	5 390		1 381	• • • •	Aguirre barrio	8 792		2 890	
Magueyes Urbano barrio.	1 660		456		Salinas zana urbana (pt ) . Lapa bazzo	684 7 248		181 2 069	
Ponce zona urbana (pt.)	1 660		456		Palmas barrio	444		116	
Maraguez barria	1 952 2 073	}	544 530		Quebrada Yeguas barrio	1 397		373	
Monte Llano barrio	385		530 143		Rio Jueyes barrio	4 097 1 040		1 376 306	
Playa barrio	20 198		5 537		Salinas pueblo	4 516		1 459	
Ponce zona urbana (pt.) Portugues barrio	20 198 3 106		5 537		Salinas zona urbana (pt.)	4 516		1 459	
Ponce zona urbana (pt.)	2 036		776 517		San German Municipio	32 941	27 990	10 422	5. 5
Portugues Urbano barrio	9 490		2 668		Ancones barria	1 629	27 990	10 432 530	7 946
Pance zona urbano (pt.)	9 490		2 668		San German zono urbona (pt.)	1 106		359	, , ,
Primero barrio	4 081	}	1 496		Cain Alto barrio	2 230		763	
Ponce rona urbana (pt.)	4 081		1 496		Cain Baju barrio	1 047 734		311 249	
Quebrada Limon barrio	854		271		Duey Alta barrio	1 237	:::	364	
Ponce zona urbana (pt.)	500 1 244		158		Dury Bajo barrio .	770		260	
Ponce zona urbana (pt.)	1 244		518 518		Guama barrio San German zona urbano (pt.)	1 308 433		574	
Kegi borrio	2 456		615		Hoconuca Alta barria	433 746		243 234	::::
Sabanetas barrio Ponce zona urbana (pt.)	/ 496		1 910						***
San Anton barrio	7 357 11 215		1 873 3 358		Hacanuco Bajo barrio	1 475		424	,
Pance zona urbana (pt.)	11 215	:::	3 358		San German zuna urbana (pt.)	804 255	:::	251 77	
i		1			Minillas barria	2 739		837	
Son Patricio barrio	85 13 5 <b>6</b> 5		34 4 880		Return borno	6 257		1 779	
Ponce zono urbana (pt.)	13 565		4 880		San German zana urbana (pt.) Rosario Alto barrio	4 271 697	• • • •	1 197 219	
Sexto borrio	7.374		2 650		Rasaria Bajo barrio	1 410	::: i	464	74.1
Tercero barria	7 374		2 650 355	.	Rosario Periori barrio	317		104	
Ponce zana urbano (pt.)	1 098		.155 355		Sabano Eneas barrio	2 058	• • • •	635	
libes borrio	1 449		399		Sabana Grande Abajo barrio	2 629		665	
Vayas barrio	1 149		371	··· į	San German zona užbana (pt.)	2 466		610	
l l	160		45	[	San German pueblo San German zona urbana (pt.)	4 562 4 562		1 673 1 673	2.00
Quebradillas Municipio	19 775	15 582	5 605	3 855	Tuna barrio	292		96	
Ougherdilles	3 974		1 117	ļ	F		ı		5 5 5 6
Charcas barria	7 <i>12</i> 326	***	234 78		San Juan Municipio	432 973 15 998	463 242	155 427	133 589
Cocos borrio .	3 448		1 002	. !	San luan zona urbana (pt.)	12 363		4 836 3 723	
Guajataca burria Quebradillas puebla	1 456		362	.	Cupey borns	27 536		7 715	
Quebrodillas zana urbano (pt.)	1 584 1 584		506 506	·i	San Juan zona w bana (pt.) El Cinco burrio	22 499 8 067		6 194	
San Antonio barrio	4 358		7 141	!	San Juan zana urbanu (pt.)	8 067	- ::: [	2 881 2 881	
San Juse barrio Terranova barrio	1 342		389	i	Gobernador Pinero barrio	50 228		17 950	
Quebradillas zona urbana (pr.)	3 287 1 431	1	1 010 424	ĺ	Sun Juan zona urbano (pt.) Hoto Rey Central barrio	50 278		17 950	
		1	9/4	!	San Juan zona urbana (pt.)	23 242 23 242	• • • •	8 758 8 758	]
Rincon Municipio Atologo borrio	11 770	9 094	3 956	2 670	•			4 130	****
Barrero barrio	844 786		237		Hato Rey Norte barrio	15 755	j	5 782	
Colvache barria	786 1 511	i	263 468		San Juan zona urbana (pt.) Hata Rey Sur barrio	15 755		5 782	I.W
Cruces barrio	1 024		285		San Juan zona urbana (pt.)	12 655 12 655		5 422 5 422	
finseneda barrio	175	1	288		Manacillo barrio	13 741		3 737	
Rincon zana urbana,(pt.) Jaguey barrio	446 696		170		San Juan zona urbana (pt.)	13 /41		3 737	,
Pueblo barrio	7 589	:	214 902	[	Monacillo (Irbano harriu San Juan zona urbana (pt.)	28 429 28 429		8 749 8 749	
Rincon zona urbano (pt.)	215		78		Oriente burrio	28 429 39 852		12 972	
Puntos barria	1 551	i	627		San Juan zono urbona (pt.)	39 852		12 972	· :
Rincon pueblo	1 041	ļ	381	1	Purblo borra	0 .01	ļ		
Rincon zona urbana (pt.)	1 041		381	. !	San Juan zona urbano (p.)	8 62J 8 621		3 391 3 391	
Rio Grande barrio	953	1	291		Quebrada Arenas barrio	1 600		527	:::
1				!	Subana Clana Norte burrio	33 472		12 093	
. 1					San Juan zona urbana (p. ) Sabana Hona Sur barrio	33 42? 38 229		12 093 12 580	- :::
•				,	and an an an an an an an an an an an an an	30 774	1	12 300	1

### Table 1. Population and Housing Unit Counts for Puerto Rico by Municipios and Municipio Subdivisions: 1980 and 1970—Con.

If ourty relate to areas as delineated at each censur. Information on boundary changes, will be shown in the PC80.1 A report for this area. For meaning of symbols,

	Papulati	un i	Howsing or	nt:	Puerto Rico		Populatio	<u>i</u>	Housing units	
Puerto Rico	<u> </u>	<del> </del>	1980		Municipios		1980		1980	. 9
Municipios Municipio Subdivisions	F/ha (prelan aary)	1976	(prelin)	1970	Municipio Subdivisions	1	(prelini inory)	1970	(prelim- inary)	1970
nomer comment			<u>-</u> - y -			<b> </b>				7 000
Son Juan Municipio Can	1	1			, Trujilo Alto Munkipio Carruzo barro		51 389 11 094	30 669	15 908 3 279	7 933
abana Uana Sur barria - Con - San Juan zana urbana (pl.)	38 729	1	12 580		trapho Alta zana urbana (pt.)	1	9 216		2 680 9 623	
San Juan Yang Aragia (b. )	9.834		4 299		Cuevas barrio Trujillo Alta zona urbana (pt.)		30 279 30 049		9 556	• • • • •
San Juan zona urbano (pt.) Ganturce barrio	9 834 100 923	1	42 165		Dos Bocas barro	٠ [	1 315		428 193	• • • • •
San Juan zona urbana (pt.)	100 923	į	42 165		Trujilla Alto zano urbana (pt.) La Gloria barrio	- }	542 3 310	::.1	968	
ortugo barrio : San Juan zona urbana (pt.)	7 714 7 714		484 484	•	Trupilo Atto rono urbono tot )	- 1	288		90 544	•••
Juniversidad parrio	2 627	1	884		Quebrada Grande barrio Quebrada Negrito barrio	- 1	1 730 2 659		745	
San Juan zona urbana (pt.)	2 627	j	884			- 1	1 002		321	
San tarenzo Municipio (ayaguas barzia	32 333 1 095	27 755	9 434 293	6 494	Tropilo Alto pueblo Empilo Alto zona arbino (pt.)	- 1	1 002		321	• • •
erro Cordo barrio	3 271 1 058	ı	953 270		Utordo Municipio	- 1	34 384	35 494	10 134	8 625
San Lorenza zana urbana (pt.)	2.889	1	834		Angeles barrio	- 1	2 802		775 499	
spina barrio Iorida barrio	3.778	-	1 097		Arenas barrio Utuado zono urbana (p.t.)	-	1 910 381		105	
lata barria	3 949		1 107 306		Enginena borno		3 843	··· į	1 175	•••
San Lorenzo zona urbana (pt.) ngual barrio	3 062	.	766		Comerc barrio		240 ! 148		86 333	
Juebrada barrio .	1 296		406 536		Coondas Arriba barria	[	275		75	
Quebrada Arenas barrio	1				Consejo barrio		744 1 184		222 362	, inst.
Quebrada Handa barrio	2 124 2 934		627 839		Dan Alansa barria Guaanka barria		387		115	
Quemados barrio San Lorenzo zona urbana (pt.)	592		208	• • •		1	1 035		266	1965   Mg. 1965   1965   1965   1965   1965   1965   1965   1965   1965   1965   1965   1965   1965   1965   1965   1965
San korenza pueblo	5 964		1 981 1 981		Las Palmas barrio Limon barrio		269		97	
San Lorenzo zona urbana (pt.)	5 964		1 761		Manueyes Abajo berejo		1 026	إ	288 212	
San Sebashiin Municipia	35 877	90 157	10 896	8 354	Paso Palma barro Rio Abajo barro	- 1	851 516		170 🖟	18 (4)
Albania barria	1 787 786		521 208		Roncadar barrio		461		116	are in
Alto Sano barrio Bahomamey barrio	3 254		1 009		Sabana Grunde barrio Salto Abaio barrio	- 1	671 5 110		195	
San Sebastian zana urbana (pt.)	3 239		1 001		Solto Abajo barrio Utuado zono urbona (pt.)		3 716		1 002	- energi
Calabazas harria Gibao barria	1 122	,	331		Salto Arrebo boreio		434		109	in it hatiful.
Cidral barria .	473 2.037		149 595		Santo Isabel burrio		755		220	4
Culebrinas barrio : San Sebastian zona urbana (pt.)	92G		212		Santo Rosa harrio	İ	8 759		172	
Eneas barrio	761		233		letuan barria Altuado pueblo	•	6 809		2 346	- 1
Guacio borrio .	518		167		Utuado zona urbana (pt.)		6 809		2 346 . 641 ·	(11)
Guajataca barrio	599		170 785		Vivi Abajo barrio Utuado zona urbana (pt.)		2 244 143		44 🦪	71.5
Guatemala barria	7 547 1 332		378	• •	Vivi Arriba barrio		903		257.	
Hato Arriba barrio	1 470		430	-	Vega Alta Município		28 725	22 810	8 375	. 5. 78
Hoya Mala barrio	2 767	• •	880 436		Bajura barria		3 418		944	19.5° e
Juncal barrio Magos barrio	212		68	•	Vega Alta zona urbana (pt.)		1 237 906		317	10 m
Mirabales barrio	559 827		168 232		Candelaria barria Lienegueta barria		210		69	1150
Perchas 1 barrio	977	•	!		Espiriosa barrio		8 622 7 088		2 483 1 917	
Perchas 2 barria	828 2 737		273 829		The transfer of the contract o		3 930		1 150	
Piedros Bloncas barrio	1 713		516		. Vega Alta zona urbana (pt.)		679 471		123	
Pozas barrio	2 473		776 330	•	Mavilla barrin Sabana horrio		9 088		2 750	
San Sebastion zona urbanu (pt.) Robles barrio	1 181	•	310		j				547	
Salto barrio .	2, 221		640		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		1 580 1 580		547	.,
San Sebastian pueblo San Sebastian zona urbana (pt.)	2 407 2 407		902 902				ļ.		14 675	9:39
Sonador barrio .	1 211		327		. Vego Boja Municipio		46 841 11 011	35 327	3 558	7 37
Santa Isabel Municipia	19 832	16 056	6 006	4 25			5 446		1 742	
Boca Velazquez barrio	1.215		323		. Almirante Norte barrio .		2 927 2 783		803	
Descalabrado barrio	4 797		1 418		Almirante Suc barrio L'Cabo Caribe barrio	-	5 281		1 468	
Felicia I barrio Santo Isabel zona urbana (pt.)	104		40		. Vega Baja zoma urbana (pt.)		4 486 4 628		1.225	
Felicia 2 barrio	1 985 2 610		558 806		Ceba barrio Cibuco barrio		55		16	., .,
Jauca 1 barrio	1 740		508		. Puerto Nuevo barrio .		3 647 986		1 441	
Playa barria	990 6 861		1 996		Pugnada Adentro barrio		1			
Santa Isabel pueblo	6 861		1 996		Pugnado Afuera barrio		8 180 2 623		2 345	
	31 946	18 964	9 058	4 53	Vega Bajo zona urbana (pl.) 8. Quebrado Arenas barrio		633		199 .	
Toa Alta Municipio (antorna barria	4 897	-0 -704	1 287	- 33	Rio Abajo barrio		4 510 4 023	• • •	1 484	· 4
Too Alta zono urbana (pt.) .	3 586		1 019		Vego Baja zona urbana (pt.) Rio Arriba barrio		4 023 252		177	1
Galateo barrio . Mucarabones barrio .	3 754 7 753	٠,	2 150		Vega Baja puebla		1 442		623	
Ortiz barrio	8 085		2 368	,	Vega Bajo zano urbano (pt.) , Xeguado barrio		1 442 506		138	
Pinas barrio Quebrada Arenas barrio	587 2 331		183 631				İ		3 079	2 3
Quebrada Krenas barrio	2 745		879		Vieques Municipio		7 628 2 655	7 767	930	2 33
Rio Lajos barrio .	966 833		280		ttor or construction total	•	521		176	
Toa Alta pueblo . Toa Alta zono urbana (pt.)	833 833		200		. Isabel II pueblo		1 801		877 877	
	İ		1	12 48	Vieques zona urbana (pt.)  2. Ulave harrio		115		33	
Toa Baja Municipia Candelario barrio	78 119 17 223	46 384	22 718 5 018	17 40	Mosquita barrio		l		431	
Media Luno barrio	9 263	•	2 775		Puerto Dioblo barrio		855		229	
Toa Bajo zona urbana (pt )	1 106		797		Puerto Ferro barra:		1 611		579	
Pala Seco barrio Sabana Seco barrio	50 327		14 486		Punta Areaas barrio				1	
Too Baja zona urbana (pt.)	9.77		372		Villalba Municipio		20 737	18 733		3 7
Toa Baja pueblo . Toa Baja zuna urbana (pt.)	873 873		327		Coundles Abajo berne		1 059		283 407	
to a sale have a sale (b)			1		Coondles Arribe berrie		1 470		238	:
					Hata Puerce Abaja barrio					





TRADE NAME: K-33-C (72%)

GENERIC NAME: CCA TYPE C

04/24/90

PAGE 1

#### SECTION I

MSDS NUMBER: 17\*CCA

MANUFACTURER ....: Osmose Wood Preserving, Inc.

EMERGENCY PHONE ..: (716) 882-5905

CHEMTREC'S EMERGENCY TELEPHONE NUMBER IS TO BE USED ONLY

ADDRESS ......980 Ellicott Street

CITY ......Buffalo STATE ..: NY ZIP ..: 14209

MSDS PREPARED BY .: Teri Muchow DATE PREPARED ....:April 23, 1990

\*\*\* ADDITIONAL INFORMATION \*\*\* EPA Registration Number: 3008-17

H.M.I.S.: Health 3, Flammability 0, Reactivity 1, Personal Protection В

\*This mixture contains ARSENIC ACID, CHROMIC ACID, and COPPER OXIDE, chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

\*Pesticide applicators are exempt from the OSHA arsenic standard 29 CFR 1910.1018.

D.O.T. CLASSIFICATION: Poison B UN2810 D.O.T. LABEL: Poison

#### SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

TRADE NAME .....:K-33-C (72%) GENERIC NAME ....: CCA TYPE C

INGREDIENT NAME	CAS	OSHA PEL	ACGIH TLV	RQ	*
Arsenic Acid (expressed as As AS205)	7778-39-4		.2 as As	1 #	24.5
Chromic Acid (water soluble) Cupric Oxide	1333-82-0 1317-39-1		.05 as Cr N/A	10 # N/A	34.2 13.3

\*\*\* ADDITIONAL INFORMATION \*\*\*

\*Acceptable ceiling concentration limit.

(OSHA PEL and ACGIH TLV are expressed in mg/M3.)

#### SECTION III - CHEMICAL CHARACTERISTICS

BOILING MELTING SPECIFIC VAPOR POINT POINT GRAVITY (WATER=1) PRESSURE (mm Hg) 100 C N/A 1.8 N/A

OSMOSE

MATERIAL SAFETY DATA SHEET - 17\*CCA

TRADE NAME: K-33-C (72%)

GENERIC NAME: CCA TYPE C

VAPOR

EVAPORATION

by VOLUME

PERCENT VOLATILE

DENSITY (air=1)

RATE ( Butyl Acetate)=1

PAGE 2

25% N

N/A

N/A

04/24/90

SOLUBILITY

REACTIVITY WITH

IN WATER

WATER

100%

N/A

APPEARANCE AND ODOR : Thick Red-Orange Paste

\*\*\* ADDITIONAL INFORMATION \*\*\*

pH(as is): < 1.0

pH(1% Soln.): 1.8 - 2.0

#### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH

FLAMMABLE LIMITS

AUTOIGNITION

POINT

METHOD

IN AIR (%)

TEMPERATURE

N/A

N/A

UPPER = N/A LOWER = N/A

N/A

EXTINGUISHER MEDIA: Water Fog and/or Carbon Dioxide

SPECIAL FIRE FIGHTING PROCEDURES:

This product will not burn; 28% aqueous solution. When heated to decomposition, arsenic may be emitted. If this material is involved in a fire or explosion, carbon dioxide or water may be used as an extinguishing agent. Wear complete fire service protection equipment, including full-face MSHA/NIOSH approved self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Chromic acid content of this product is a strong oxidizing agent; contact with strong reducing agents may cause an explosion. May cause fire on contact with combustible materials. Closed containers may explode when exposed to extreme heat (fire).

#### SECTION V - REACTIVITY DATA

IS THIS CHEMICAL STABLE UNDER NORMAL CONDITIONS OF HANDLING/STORAGE (Y/N)? Y

CONDITIONS TO AVOID:

Reducing Agents

INCOMPATIBILITY (MATERIALS TO AVOID):

Strong reducing agents. Aluminum and zinc in an acid medium.



TRADE NAME: K-33-C (72%)

GENERIC NAME: CCA TYPE C

HAZARDOUS DECOMPOSITION PRODUCTS:

Under certain conditions where aluminum and zinc (e.g. galvanized steel) are present, arsine gas may be generated.

HAZARDOUS POLYMERIZATION POSSIBLE (Y/N) ? N

CONDITIONS TO AVOID:

N/A

#### SECTION VI - HEALTH HAZARDS

ROUTES OF ENTRY: The principal routes of exposure for this solution are by skin or eye contact. If the pesticide application process generates mist or particles, inhalation is an additional significant route of exposure. This solution is highly corrosive, as indicated by its pH. Skin or eye contact may result in severe burns. Chronic skin exposure may result in skin ulcers. Inhalation of this solution is highly irritating, and acute exposure by inhalation may result in chemical pneumonitis.

SIGNS AND SYMPTOMS OF -

ACUTE OVEREXPOSURE:

Highly irritating to skin and eyes. Repeated dermal exposure may cause dermatitis. Toxic by ingestion, causes gastroenteritis, esophageal pain, vomiting and anuria or oliguria.

CHRONIC OVEREXPOSURE:

Repeated dermal exposure may cause dematitis.

MEDICAL CONDITIONS GENERALLY

AGGRAVATED BY EXPOSURE:

Individuals with an existing (or a history of) disease of the skin, kidney, liver, lungs or nervous system may be at greater risk of developing either acute or chronic health effects.

CHEMICAL LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN NATIONAL TOXICOLOGY PROGRAM IARC MONOGRAPHS

NATIONAL TOXICOLOGY PROGRAM
(Y/N): N

(Y/N): N

OSHA

(Y/N): N

\*\*\* ADDITIONAL INFORMATION \*\*\*

For CARCINOGEN information, see Chronic Effects notes on page 4.

LD50: >50 mg/kg

Dermal LD50: < 200 mg/kg

04/24/90

PAGE 3

EMERGENCY AND FIRST AID PROCEDURES EMERGENCY PHONE NUMBER OF MANUFACTURER: (716) 882-5905





TRADE NAME: K-33-C (72%)
GENERIC NAME: CCA TYPE C

1. INHALATION:

For acute inhalation, remove the victim from exposure,

restore breathing and seek medical attention

immediately.

2. EYE CONTACT:

Immediately flush with large quantities of water.

Seek medical attention as soon as possible.

3. SKIN CONTACT:

Immediately flush skin with large volumes of water.

Seek medical attention as soon as possible.

4. INGESTION:

Immediately seek medical attention; do not induce vomiting. If it appears that the victim may not receive medical attention within 15 minutes, and if conscious, give one glass of milk, preferably containing 2 ounces of milk of magnesia or 3 egg whites, or give lime water or 1 tabelspoon salt

in warm water; induce vomiting.

#### \*\*\* ADDITIONAL INFORMATION \*\*\*

NOTES TO PHYSICIAN:

Treat for arsenic pentoxide (As205) and chromium trioxide (CrO3) exposure. Severe arsenic poisoning from occupational exposure is unlikely. If it should occur, administer BAL (dimercaprol) 10% in oil, IM, 3 mg/kg for each ijection - day 1 and 2, every four hours; day 3, every 6 hours; day 4 - 14, every 12 hours. Consider gastric lavage (if vomiting has not already occurred).

#### CHRONIC EFFECTS

IARC, NTP and OSHA do not consistently distinguish among arsenic or chromium compounds, but list inorganic arsenic and chromium and certain specific chromium compounds as human carcinogens. Such listings have been based upon cancer in human populations following long term consumption of inorganic trivalent arsenic, inhalation and skin contact with inorganic trivalent arsenical compounds and the combined inhalation of arsenic trioxide, sulfur dioxide and other particulates from ore smelting in arsenic trioxide protection. The ACGIH has not listed inorganic arsenic as a carcinogen, but has listed the production of arsenic trioxide as a process which may lead to the development of cancer. In addition, cancers in humans have followed long term occupational exposure to certain nonwater soluble hexavalent chromium.

This product does not contain trivalent arsenic or nonwater-soluble hexavalent chromium compounds. Furthermore, epidemiology studies and cross sectional health studies of treating plant workers would indicate that this product is not a carcinogen when used in accordance with customary practices found in the wood preserving industry.



TRADE NAME: K-33-C (72%)

GENERIC NAME: CCA TYPE C

04/24/90 PAGE 5

For pesticide applicators, read and understand the label thoroughly. The EPA PEL program is part of the label.

#### SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Engineering controls are the preferred method for controling exposure to chemicals. If enginering controls are not feasible, then personal protective equipment should be utilized. Read Osmose Operation Manual.

#### OTHER PRECAUTIONS:

Launder contaminated clothing before reuse. If interior of shoes are contaminated, either directly or through penetration, delayed skin burns may occur, therefore discard. READ PRODUCT LABEL.

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Avoid contact with solution. Prevent spread of the spill or leak. Recover or neutralize free standing liquid with Osmose Neutralizing Compound or sawdust. Collect absorbent and contaminated soil in DOT approved containers. This material is toxic to fish and other wildlife, do not allow it to contaminate waterways. Individuals involved in clean-up should be protected from contact with the solution by using appropriate protective equipment.

#### WASTE DISPOSAL METHODS:

Dispose in accordance with all Federal (Resource Conservation and Recovery Act), State and Local laws. Excess chemical and waste material collected from a release or spill must be disposed of in an approved hazardous waste disposal site in accordance with RCRA guidelines. Containers may be triple rinsed and then buried in a sanitary landfill or removed to a drum reclaimer. The RQ for this material is one pound. In the event of a spill exceeding the RQ, the same must be reported to the National Response Center (1-800-424-8802).

\*\*\* ADDITIONAL INFORMATION \*\*\*
Dispose in accordance with Federal, State, and Local Laws.

#### SECTION VIII - CONTROL MEASURES

#### RESPIRATORY PROTECTION:

When respiratory exposure can exceed 0.01 mg/m3, 29 CFR 1910.1018 states that a half-mask air purifying respirator equipped with high efficiency particulate filters is recommended. When environmental airborne concentrations are greater than this level, consult 29 CFR 1910.1010 for guidelines and appropriate respiratory protection.

#### **VENTILATION REQUIREMENTS:**



TRADE NAME: K-33-C (72%)

GENERIC NAME: CCA TYPE C

VENTILATION REQUIREMENTS: - Continued

N/A

LOCAL EXHAUST:

Sufficient

MECHANICAL:

N/A

SPECIAL:

N/A

OTHER:

N/A

PROTECTIVE GLOVES:

29 CFR 1910.1018 requires that workers wear gloves (NBR, natural rubber,

neoprene, coated vinyl or PVC).

EYE PROTECTION:

Chemical goggles and face shield.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

An apron and other equipment necessary to avoid dermal contact.

WORK/HYGENIC PRACTICES:

Wash hands before eating, drinking, smoking, and after work.

\*\*\* ADDITIONAL INFORMATION \*\*\*

SARA/TITLE III HAZARD CATEGORIES

Immediate (Acute) Health: YES

Reactive Hazard: NO

04/24/90

Delayed (Chronic) Health: YES

Sudden Release of

Pressure: NO

Fire Hazard: NO

N/A = Not Applicable

NOTICE: The information herein is given in good faith but no

warranty, expressed or implied, is made, and Osmose Wood Preserving, Inc. expressly disclaims liability from reliance

on such information.

Information on this form is furnished for the purpose of compliance with the Occupational Safety and Health Act of 1970 and shall not be used for any other purpose. Use or dissimination of all or any part of this information for any other purpose may result in a violation of law or constitute grounds for legal action.

PAGE 6



#### The following statement is part of the label for each of these products:

K-33-C (50%), EPA Reg. No 3008-36 K-33-C (72%), EPA Reg. No 3008-17 K-33-B (40%), EPA Reg. No 3008-35 K-33-A (50%), EPA Reg. No 3008-42

#### Implementation of the Permissible Exposure Limit (PEL) Monitoring Program.

Each arsenical wood treatment plant employer shall require all employees potentially exposed to airborne inorganic arsenic to wear properly fitting, well maintained high efficiency filter respirators MSHA/NIOSH-approved for inorganic arsenic for the entire period that the employees are in the treatment application work area or engaged in any activity associated with the treatment process. Alternatively, to potentially relieve employees from the burden of wearing respirators, the employer may implement a Permissible Exposure Limit (PEL) monitoring program. This requirement becomes effective for existing plants on July 10, 1986. Any plants which begin operations in the future will have 3 months from the date of initial operation to implement this requirement.

All wood treatment plant employers who elect to implement the PEL monitoring program must determine the current levels of airborne arsenic, averaged over an 8-hour period, to which their employees are exposed by July 10, 1986. Monitoring data obtained two years prior to this implementation date may be used to determine the initial levels of airborne exposure to employees, if the data was obtained in the same manner as described below in the "Monitoring and Measurements Procedures" unit, and if the employer can certify that no changes have been made since the time of monitoring that could have resulted in new or additional employee exposure to inorganic arsenic including events on the "PEL Checklist" below.

If the initial or subsequent monitoring demonstrates that airborne inorganic arsenic in a work area is greater than 10 ug/m³, all employees working in that area are required to wear properly fitting, well-maintained high efficiency respirators MSHA/NIOSH-approved for inorganic arsenic. If in subsequent monitoring, at least two consecutive measurements taken at least 7 days apart, the inorganic arsenic levels are below 10 ug/m³, employees in those areas may discontinue the wearing of respirators, except as discussed in the "PEL Checklist" below. However, if the employee exposure is above 5 ug/m³ and below 10 ug/m³, the employer shall repeat monitoring at least every 6 months until at least two consecutive measurements, taken at least 7 days apart, are below 5 ug/m³. The employer may then discontinue monitoring, except as discussed in the "PEL Checklist" below.

#### PEL Checklist

In all cases where there has been a change in production, process, control, or employee handling procedures, or if any events in the PEL Checklist occurred, or if, for any other reason an employer should suspect new or additional airborne inorganic arsenic, additional monitoring that complies with the requirements for initial monitoring shall be completed. Responses to the Checklist will become part of the monitoring records. Monitoring is required within 3 months if any of the following events/questions on the Checklist can be answered in the affirmative with respect to any events which may have occurred since the last monitoring report submitted to the Agency:

- 1. After the wood has been treated, have you changed from hand stacking to mechanical stacking or from mechanical stacking to hand stacking? If yes, when?
- 2. Has your production capacity increased significantly? If yes, when?

- 3. Have you changed from a ready-to-use or dilute concentrate to a mix-it-yourself formulation? Has the proportional amount of arsenic in the solution increased, e.g., have you shifted from CCA type A or C to type B? If yes, when?
- 4. Has a significant, i.e., reportable under the "Comprehensive Environmental Response, Compensation and Liability Act of 1980" (Superfund), 42 U.S.C. 9601 et seq., spill occurred? If yes, when?
- 5. Is treated wood being retained on the drip pad for less time? If yes, when?
- 6. Have there been any other production, process, control or employee handling procedure changes which could result in new or additional airborne inorganic arsenic? Identify change, and when it occurred.

#### Monitoring and Measurement Procedures

The employer shall collect personal air samples, including at least one sample which is adequate to represent typical conditions for a full work shift (at least 7 hours) for each job classification in each work-area. Sampling should be done using a personal sampling pump calibrated at a flow rate of 2 liters per minute. Samples should be collected on 0.8 micrometer pore size membrane filter (37mm diameter). The method of sampling analysis should have an accuracy of not less than ±25 percent (with a confidence limit of 95 percent) for 10 micrograms per cubic meter of air (10 ug/m³) and ±35 percent (with confidence limit of 95 percent) for concentrations of inorganic arsenic between 5 and 10 ug/m³.

Monitoring may be conducted through a request made to the Occupational Safety and Health Administration (OSHA) for monitoring assistance which may be provided free of charge under the terms of the OSHA consultation program as provided under section 7(c)(1) of the OSHA Act, or by employees or contractors of the employer's choosing.

The Environmental Protection Agency (EPA) may direct that remonitoring take place at statistically selected establishments to assure that the Checklist is effective in identifying events which increase airborne arsenic. Selected employers will be notified by EPA/State enforcement representatives. The employer will be responsible for obtaining current air monitoring data within the time specified in the remonitoring notification and for submitting these data and reports to the EPA as described below.

#### **Data Submission and Certification**

The employer shall establish and maintain accurate records which include responses to the PEL Checklist and all monitoring reports. The annual records or copies thereof shall be submitted to the U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances Office of Compliance Monitoring (EN-342), 401 M Street SW, Washington, DC 20460. All records submitted will be certified by the employer as accurate and in compliance with all calibration, analytical and sampling requirements outlined in this program. If the employer received assistance from an OSHA 7(c)(1) consultant, that consultant's report to the employer will be an acceptable record of calibration, analysis and monitoring requiring no additional certification.



# **DIRECTIONS FOR USE**

a violation of Federal law to use this product in inconsistent with its labeling.

(For Pressure Plant Use Only)

MOSE K-33-C is designed for the pressure impregnation of to provide protection against decay, termites and marine . (Limnoria and Teredo

on the treated wood. Small isolated or infrequent spots emical on otherwise clean wood shall be allowed. eave no visible surface deposits on the wood, as defined IPA Standard C-1 and AWPB Standards LP2 and LP22. le surface deposits means a surface residue or crystallicesses used to apply inorganic arsenical formulations

aminate water by cleaning of equipment or disposal of ater. Do not apply where runoff is likely to occur. Do product is toxic to fish and wildlife. Do not apply

## CHEMICAL HAZARDS PHYSICAL OR

id contact with aluminum or zinc galvanized metal.

Water

ning (e.g., gloves, overalls, jackets, and boots) red wired g application and handling of inorganic arsenical s are 1 to User: Examples of acceptable materials for protective polyvinyl chloride (PVC), neoprene, NBR (Prim and polyethylene

# STORAGE AND DISPOSAL

چ rage or disposal. Open dumping is prohibited. Do not IRAGE: Do not contaminate water, food or feed se empty container.

STICIDE DISPOSAL: Pesticide wastes are acutely hazardrinsate is a violation of Federal Law. If these wastes nnot be disposed of by use according to label instrucins, contact your State Pesticide or Environmental Conol Agency, or the Hazardous Waste representative at the s. Improper disposal of excess pesticide, spray mixture sarest EPA Regional Office for guidance.

**DNTAINER DISPOSAL:** Triple rinse ffer for recycling or recondity ose of in a sanitary landfill, or procedures

# **USE PEST ESTRICTED**

For retail sale to and use only by Certified Applicators or persons under their direct supervision, and only for those uses covered by the Certified Applicator's Certification

(For Pressure Plant Use Only)

(Not For Use Or Storage In Or Around The Home)

**ACTIVE INGREDIENTS:** Chromie Acid ..... Arsenic Pentoxide

13.3% 34.2%

100.0% 

## KEEP OUT OF REACH OF CHILDRE ( Sept.

IF SWALLOWED: Induce vomiting by touching the back of the throat with finger. Avoid aspiration of vomit. Do not induce vomiting of an unconscious person. Call a physician immediately. IF INHALED: Remove victim to fresh air. Apply respiration if indicated. Call a physician immediately. **DN SKIN:** Remove contaminated clothing and wash affected area with soap and water.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS IN EYES: Flush eyes with plenty of water. Call a physician immediately.

EPA Est. 3008-TN-1



E.P.A. Reg. No. 3008-17 Osmose Wood Preserving, Inc.

980 Ellicott Street Buffalo, New York 14209

**NET CONTENTS: 275 LB** 

### SWALLOWED OR ABSORBED **HAZARDS TO HUMANS** & DOMESTIC ANIMALS DANGER: POISONOUS | THROUGH THE SKIN **PRECAUTIONARY**

smoking. Wear eye protection devices and protective clothing and rub gloves in all situations where dermal contact is expected. In case contact flush skin or eyes with plenty of water. For eyes get medi attention. Wash clothing before reuse. Do not breathe spray mist. Causes eve and skin irritation. Do not breathe vapor. Do not get in eyes skin, or on clothing. Wash thoroughly after handling and before eatin

freshly treated wood and manually opening cylinder doors). Individuals who enter pressure treatment cylinders and cither rela Applicators must wear gloves impervious to the wood treatment for lation in all situations where dermal contact is expected (e.g., hand

approved for inorganic arsenic, if the level of inorganic arsenic in the pl is unknown or exceeds 10 micrograms per cubic meter of air (10,00) average over an 8-hour work period. Air monitoring programs, procedu and record retention and submission must be conducted in accordance w must wear protective clothing, including overalls, jacker, gloves, boots, impervious to the wood treatment formulation. In addition, indi uals who enter pressure-treatment cylinders must wear properly fitte well-maintained, high efficiency filter respirators, MSHA/NIO; cylinders that are in operation or are not free of the treatment solu equipment that is contaminated with the wood treatment solution the instructions on the attached labeling material.

15.9%

15.9%

28.0%

Applicators must not eat, drink, or use tobacco products during the moving trams out of cylinders, mixing chemicals, and handling fres parts of the application process that may expose them to the wo treatment formulation (e.g., manually opening/closing cylinder doc treated wood)

Wash thoroughly after skin contact, and before eating, drinking, use tobacco products, or using restrooms.

Protective clothing must be changed when it shows signs of contain nation. Applicators must leave protective clothing and workshoes or bo and equipment at the plant. Worn-out protective clothing and workshoe pesticide disposal and in accordance with state and federal regulation boots must be left at the plant and disposed of in a manner approved

Individuals in the work area of an arsenical wood, treatment plant m wear properly fitting, well-maintained high efficiency filter respirato MSHA/NIOSH-approved for inorganic arsenic, if the level of inorgai arsenic in the plant is unknown or exceeds 10 micrograms per cubic me accordance with the instructions on the attached labeling material

#### OSMOSE K —33 — C (72%) PRESERVADOR DE MADERA

Insecticida y Fungicida
Para uso en Plantas de Presión únicamente
(No para uso ni almacenamiento en el hogar)
CONTENIDO NETO: 125 Kilos (275.578 Libras)

#### INGREDIENTES ACTIVOS:

#### \*\*\* INGREDIENTES INERTES:

100.0%





**VENENO** 

ANTIDOTO: Suministre una cucharada de sal en un vaso de agua tibia y repita hasta que el vómito sea claro. Luego suministre dos cucharadas de Sal de Inglaterra o Leche de Magnesia en agua. Luego mucha leche y agua. Que la victima se acuesta y se mantenga quieta.

#### PELIGRO MANTENGA FUERA DEL ALCANCE DE LOS NIÑOS

VENENOSO SI SE INGIERE: Puede ocasionar picazon y úlceras externas. Manéje con guantes de hule. Evite el contacto con la piel, los ojos y la ropa. En caso de contacto enjaguese bien la piel y los ojos con agua. -Para los ojos obténga atención médica. Lávese muy bien después de usarlo. Lave muy bien la ropa antes de re-usarla. No respire los vapores atomizados. Este producto es tóxico para los peces y animales salvajes. Manténga fuera de lagos, arroyos y estanques. No contamine el agua en lavaderos. Use el producto únicamente en la forma especificada en plantas Immunizadoras a presión.

PELIGRO: Todo remanente de pesticida en este recipiente debe ser removido y bien lavado no se debe usar de nuevo.

DIRECGIONES PARA DESCONTAMINACION: Vacie el contenido en el tanque almacenador y enjuágue el recipiente con 2000 litros de agua que puede usarse con la mezcla de solucion.

OSMOSE INTERNATIONAL, INC.
980 Ellicott Street • Buffalo, New York 14209 • U.S.A.